CHAPTER 4
ENVIRONMENTAL IMPACTS OF CONSTRUCTION

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ACRONYMS AND ABBREVIATIONS

ac.	acre
ALARA	As Low As Reasonably Achievable
AP1000	Westinghouse Electric Company, LLC, AP1000 Reactor
APE	Area of Potential Effect
BEA	Bureau of Economic Analysis
BMP	best management practice
BOC	Board of County Commissioners
CEQ	Council on Environmental Quality
CFBC	Cross Florida Barge Canal
CFG	Marjorie Harris Carr Cross Florida Greenway
CFR	Code of Federal Regulations
cm	centimeter
CO	carbon monoxide
COL	Combined License
COLA	Combined License Application
CREC	Crystal River Energy Complex
CWA	Clean Water Act
CWIS	cooling water intake structure
DCD	Westinghouse Electric Company, LLC, AP1000 Design Control Document for the certified design as amended
DRI	development of regional impact
DU	dwelling unit
E&SCP	Erosion and Sedimentation Control Plan
EHSS	Environmental Health and Safety Services

ACRONYMS AND ABBREVIATIONS (CONTINUED)

ER	Environmental Report
ERP	Environmental Resource Permit
ESO	Environmental Support Organizations
ESRP	Environmental Standard Review Plan
F.A.C.	Florida Administrative Code
F.S.	Florida Statute
FDCA	Florida Department of Community Affairs
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEGN	Florida Ecological Greenways Network
FESC	Florida Energy Sources Coalition
FFWCC	Florida Fish and Wildlife Conservation Commission
FGDL	Florida Geographic Data Library
FLUCCS	Florida Land Use and Cover Classification System
FMSF	Florida Master Site File
FNAI	Florida Natural Areas Inventory
ft.	foot
gpd	gallon per day
gpm	gallon per minute
GSF	gross square feet
ha	hectare
in.	inch

ACRONYMS AND ABBREVIATIONS (CONTINUED)

km	kilometer
km^2	square kilometer
kV	kilovolt
LNP	proposed Levy Nuclear Plant Units 1 and 2
LNP 1	proposed Levy Nuclear Plant Unit 1
LNP 2	proposed Levy Nuclear Plant Unit 2
LWA	Limited Work Authorization
m	meter
m^3	cubic meter
mi.	mile
$mi.^2$	square mile
mg/kg	milligram per kilogram
MHW	mean high water
mrad	milli-radiation absorbed dose
mrem	milliRoentgen equivalent man
mrem/yr	milliRoentgen equivalent man per year
mSv	milliSievert
NAAQS	National Ambient Air Quality Standards
NAVD88	North American Vertical Datum of 1988
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NRHP	National Register of Historic Places

ACRONYMS AND ABBREVIATIONS (CONTINUED)

ORC	Objections, Recommendations, and Comments
PEF	Florida Power Corporation doing business as Progress Energy Florida, Inc.
person-rem	person-roentgen equivalent man
person-Sv	person-Sievert
PM	particulate matter
PM_{10}	particulate matter of 10 micrometers and smaller
PPSA	Power Plant Siting Act
PUD	planned unit development
RIMS	Regional Input-Output Modeling System
ROMA	Regional Off-Site Mitigation Area
ROW	right-of-way
RV	recreational vehicle
SCA	Site Certification Application
sec/m^3	second per cubic meter
SHPO	State Historic Preservation Officer
SO_2	sulphur dioxide
SSC	structures, systems, and components
Sv/yr	Sievert per year
SWFWMD	Southwest Florida Water Management District
SWP3	Stormwater Pollution Prevention Plan
TOC	total organic carbon
USACE	U.S. Army Corps of Engineers
USC	United States Code

ACRONYMS AND ABBREVIATIONS (CONTINUED)

USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
Westinghouse	Westinghouse Electric Company, LLC
WMS	worst meteorological sector
X/Q	atmospheric dilution factor
yd^3	cubic yard

4.0 ENVIRONMENTAL IMPACTS OF CONSTRUCTION

This chapter of the Environmental Report (ER) presents the environmental impacts of construction and is organized by the following sections:

- ER Section 4.1 — Land Use Impacts
- ER Section 4.2 — Water-Related Impacts
- ER Section 4.3 — Ecological Impacts
- ER Section 4.4 — Socioeconomic Impacts
- ER Section 4.5 — Radiation Exposure to Workers
- ER Section 4.6 — Measures and Controls to Limit Adverse Impacts during Construction
- ER Section 4.7 — Cumulative Impacts Related to Construction Activities
- ER Section 4.8 — Activities Undertaken Under a Limited Work Authorization

As discussed in ER Chapter 3, construction of the proposed Levy Nuclear Plant Units 1 and 2 (LNP) site will result in a large industrial facility similar in general appearance to most nuclear power generating facilities. The Westinghouse Electric Company, LLC (Westinghouse), AP1000 Design Control Document for the certified design as amended (DCD), indicates that the plant arrangement (for each Westinghouse AP1000 Reactor [AP1000] unit) is made up of the following five principal building structures: nuclear island, turbine building, annex building, diesel generator building, and radwaste building. ER Subsection 3.1.1 discusses in detail the location of the two reactors and ancillary power production support facilities comprising approximately 121 hectares (ha) (300 acres [ac.]) near the center of the site. However, the size of the developed area (including material and equipment laydown areas) is expected to be approximately 242.8 ha (600 ac.).

The construction impacts of the following major LNP components are discussed:

- On-Site Areas:
  - Proposed Levy Nuclear Plant Unit 1 (LNP 1), proposed Levy Nuclear Plant Unit 2 (LNP 2), and associated cooling towers.
  - 500-kilovolt (kV) switchyard.
  - Site access roads.

  - Stormwater ponds.

- Transmission Corridor and Off-Site Areas:

  - Transmission corridors (south transmission line corridor leaving the site as well as the individual 500-kV transmission line corridors and associated substations and switchyard).

  - Heavy haul road and barge slip access road.

  - Anticipated barge slip.

  - Proposed railroad.

  - Makeup and blowdown pipeline corridor and associated cooling water intake and discharge structures.

It is noted that the construction impacts described in this section are in reference to the cumulative construction impacts that will occur during the construction of the entire LNP. These cumulative impacts are summarized in ER Subsection 4.6.2. ER Subsection 4.6.2 also provides a summary of the estimated construction impacts attributable to the construction of "safety-related structures, systems, or components (SSCs)" of the facility (that is, as defined in 10 CFR 50.2, "Definitions"). These estimates provide additional information on "construction" and "pre-construction" activities, where "construction" refers only to SSC-related activities.

4.1 LAND USE IMPACTS

This section describes the land use impacts of construction and is divided into three subsections that address the site and vicinity, appurtenant facilities and off-site areas, and historic properties, respectively. Because land use impacts are also discussed in ER Subsection 4.3.1 and ER Section 4.4, the discussion in this section is limited to those direct physical changes and restrictions on land use at the site and vicinity as a result of plant construction.

The following assumptions, which are discussed further in ER Subsection 4.4.2, are used to bracket land use impacts associated with construction:

- Site preparation will take approximately 18 months, commencing by 2010 or 2011.

- Construction will take approximately 3 to 4 years, with the construction schedule staggered 1 year between units.

- Construction will be complete in 2016 or 2017 for LNP 1 and in 2017 or 2018 for LNP 2.

- Peak workforce is projected by Florida Power Corporation doing business as Progress Energy Florida, Inc. (PEF) to be 2700 workers during 2014.

Existing land use information from the Southwest Florida Water Management District (SWFWMD), St. Johns River Water Management District, and Suwannee River Water Management District for the time period from 1994 to 2004 was used to create a contiguous coverage for the entire LNP region (see Figures 2.2-26 and 4.1-1) (References 4.1-001 and 4.1-002). The Florida Land Use and Cover Classification System (FLUCCS) categories were rectified with U.S. Geological Survey (USGS) Anderson Level II classifications, as presented in Table 2.2-1 (References 4.1-003 and 4.1-004).

Generalized future land use for the site, vicinity, and region was acquired from the Florida Geographic Data Library (FGDL) is illustrated on Figure 4.1-2. The future land use designation areas are mapped as polygons that represent the areas of future land use as defined by a county or municipalities comprehensive growth plans as of 2008 (Reference 4.1-005). Note that the LNP site future land use designation is still shown as agricultural/rural residential pending final approval of the “Public Use” future land use designation, as discussed in ER Subsection 4.1.1.1.1. These maps are maintained by county and municipal planning agencies, as well as private agencies through contract, to create regional maps of "sociocultural" features, including hospitals, parks, cemeteries, historical structures, and others. Other future land use components such as developments of regional impact (DRIs) and planned unit developments (PUDs) that are also indicative of future development trends are shown on Figure 4.1-3 and summarized in Tables 4.1-1 and 4.1-2. (References 4.1-006 and 4.1-007)

4.1.1 THE SITE AND VICINITY

This subsection assesses the direct impacts of construction on land use at the site and in the vicinity of the LNP site; it builds on the following information found in ER Chapter 2 and later subsections of this chapter:

- ER Subsection 2.2.1.1 — Land use categories, major uses, and absence of prime farmland (Table 2.2-2 and Figures 2.2-2, 2.2-3, and 2.2-4).
- ER Subsection 2.2.1.3 — Highways, railroads, and utility right-of-ways (ROWs) (Figures 2.1-1 and 2.2-1).
- ER Subsection 2.2.1.4 — Special land uses, recreation, and visually sensitive areas (Figures 2.1-1 and 2.2-5).
- ER Subsection 2.2.1.2 — Mineral resources.
- ER Subsection 2.5.3 — Native American tribal land uses.
- ER Section 2.8 — Confirmation that no federal project activities associated with the LNP project were identified.

- ER Subsection 2.4.1.1.1.3 — Existing wetlands.
- ER Subsection 4.2.1.1 — Floodplains.

It provides analysis and evaluation of the potential land use impacts and mitigation recommendations, where appropriate; however, it is limited to the consideration of potential direct land use impacts at the site and indirect impacts in the site vicinity, and it does not include transmission line, access corridor, or off-site area impacts, which are addressed under ER Subsection 4.1.2.

4.1.1.1 Long-Term Land Use Restrictions and Physical Changes of Site and Vicinity

The following subsections discuss the area and location of the land in the site and vicinity that will be disturbed by construction on either a long-term or short-term basis. Table 4.1-3 summarizes the special land types in the LNP site and vicinity while providing a cross reference to where potential impacts on these special lands are discussed in ER Chapter 4.

4.1.1.1.1 Long-Term Land Use Restrictions

The State of Florida is made up of state, regional, and local planning authorities. At the local level, a comprehensive land use plan discusses the current and future land use classifications. Each of the counties located within the site and vicinity have prepared comprehensive land use plans, which are discussed in ER Subsection 2.2.2.6. Chapter 8, Future Land Use Element, of Levy County's 1999 Comprehensive Plan discusses the current and future land use plans for the county which currently designate the site as Forestry/Rural Residential (1 dwelling unit [DU] per 20 ac.) (Reference 4.1-008). A large-scale future land use map and text amendment were submitted to the Florida Department of Community Affairs (FDCA) in February 2007 to change the LNP site designation to Public Use to allow for a nuclear power generating facility, and to change the definition of public use in the comprehensive plan. The FDCA returned an Objections, Recommendations, and Comments (ORC) report to the Levy County Board of County Commissioners (BOC) on September 28, 2007 (Reference 4.1-009). In response to the ORC, the BOC addressed development intensity issues and site suitability issues during amendment of the conservation element, infrastructure element, and the future land use element of the comprehensive plan. PEF agreed the two nuclear plants would produce no more than 3000 megawatts, and traffic from workers would be limited because the maximum number of full-time employees will not exceed 1500 workers.

The BOC adopted ordinances related to the Amendment on March 18, 2008, and the FDCA issued its Notice of Intent on May 8, 2008 that the ordinances are in compliance. The effective dates of the ordinances are pending a 21-day administrative review period and either an FDCA final order or the Administration Commission finding the amendment adopted by the BOC to be in compliance with Section 163.3184 of the Florida Statutes (F.S.), after which the site will be

designated as Public Use. Public use provides for public buildings and grounds including public utilities, which are defined as gas, water, and electric, water power, well houses, electric substations, power generating facilities, sewerage, telephone facilities, utility poles and street lighting, and other similar equipment necessary for the furnishing of adequate services (References 4.1-010 and 4.1-011).

As stated in ER Subsection 2.2.1.1, there are no special land use categories, such as Prime Farmland, within the site boundary as defined by NUREG-1555 (Table 4.1-3). Based on Figure 4.1-1 and Table 4.1-4, a total of 50.8 ha (125.5 ac.) of mixed forest lands and 15.2 ha (37.6 ac.) of other agricultural land, described further in ER Subsection 2.2.1 as rural open lands, tree plantations, and cypress, would be changed on-site at the LNP. Table 2.2-2 illustrates that these lands are not unique to the site or vicinity, with mixed forest lands and other agricultural lands representing 28.6 percent and 3.9 percent of the vicinity, respectively. Because of the limited area (under 75 ha [185 ac.]) and the fact that these lands are not unique to the vicinity, no restrictions on the use of land (that is, farmlands/forests) are expected. Therefore, land use restriction impacts are anticipated to be SMALL.

4.1.1.1.2 Long-Term Physical Changes of Site and Vicinity

As mentioned previously, the LNP site is approximately 1257 ha (3105 ac.) in size, with the primary location for the two reactors and ancillary power production support facilities comprising approximately 121 ha (300 ac.) near the center of the site. This subsection discusses the direct physical changes to land use on-site and indirect physical changes to land use in the vicinity. ER Subsection 4.1.2.2 discusses the off-site land use impacts.

Table 2.2-2 summarizes the land use distribution for the site, vicinity, and region. Mixed forest lands (57 percent of the total site) and forested wetlands (34 percent) are the primary land uses at the LNP site as illustrated in relation to the LNP-associated facilities in Figures 2.2-3 and 4.1-1.

Much of the LNP site, in particular, the reactor locations, has been in intensive silviculture production for over a century. Tree production and harvesting operations have extensively altered the natural configuration of the vegetation and the land surface by creating a series of elevated hillocks, separated by shallow furrows. Young saplings are planted on the hillocks, and following periodic harvesting, the harvested areas are re-tooled and new trees are planted on the hillocks. Planted pine has replaced natural vegetative communities across much of the LNP site. Areas that will be disturbed by construction on either a long- or short-term basis are located at or near the coordinates listed in Table 2.1-1.

4.1.1.1.2.1 On-Site Land Use Changes

Table 4.1-4 summarizes the on-site land use changes anticipated by construction of the LNP by general component (Figure 4.1-1). Construction activities within

the LNP site boundary will change the existing use of 82.2 ha (203.2 ac.) of land, or 6.5 percent of the total LNP site, and 0.3 percent of the total vicinity area. The footprints of LNP 1, LNP 2, and cooling towers will change 14.8 ha (36.6 ac.) of land from primarily other agricultural lands (62.5 percent), forested wetlands (18.2 percent), and mixed forests (17.1 percent) to a transportation, communications, and utilities land use. Other on-site features include a 500-kV switchyard affecting 17.8 ha (44.0 ac.) of land. Upgrading site access roads will affect 11.7 ha (28.9 ac.) (Table 4.1-4 and Figure 4.1-1). The creation of the three stormwater ponds (A, B, and C [C1 and C2]) illustrated on Figure 2.1-2 will replace 36.2 ha (89.5 ac.) of land currently used for mixed forests (25.1 percent), wetlands (8.2 percent), and other agricultural lands (3.0 percent) (as illustrated on Figure 2.2-3).

The three stormwater ponds will be designed to fully retain the runoff from a 25-year, 24-hour rainfall event. If necessary, the stormwater collected in the ponds may be pumped to the cooling tower blowdown basin. To comply with SWFWMD rules, these ponds will recover in no less than 5 days. The bottom of the storage zone of the ponds (pump off) will be at an elevation of 12.8 meters (m) (42 feet [ft.]), which is also the estimated high groundwater elevation. Although the ponds are designed to retain a 25-year, 24-hour rainfall event, larger storm events (100-year rainfall) will be drained out of the ponds through broad-crested weir emergency spillways provided in each of the ponds. A minimum freeboard of 0.6 m (2 ft.) will be provided for each pond above the spillway elevation. Water will be discharged from the spillways through long spreader swales to pass runoff to the surrounding wetland as sheet flow to prevent erosion.

As discussed in ER Subsection 2.3.1 and illustrated in Figure 4.1-4, much of the LNP site and much of the vicinity is located in the 100-year floodplain. The existing ground elevation near the main reactors and the cooling towers is 12.8 m (42 ft.) North American Vertical Datum of 1988 (NAVD88), while the overall property elevation varies from 12.5 m to 14.9 m (41 ft. to 49 ft.) NAVD88. After grading, the land around the reactors and cooling towers will be raised to elevation 15.2 m (50 ft.) NAVD88, while the switchyard and construction laydown areas in the periphery around the main plant building will be raised to 14.3 m (47 ft.) NAVD88. Because the ground elevation at the main reactors and the cooling towers will be raised 2.4 m (8 ft.) above the existing grade, these structures will be above the 100-year floodplain.

Table 4.1-4 summarizes and ER Subsection 2.4.1.1.1 discusses field observations of the approximately 16 ha (39.61 ac.) of forested and nonforested wetlands found on-site (Figure 4.1-1). Coordination with the appropriate regulatory agencies to address Clean Water Act (CWA) 404 and 401 requirements will occur, and mitigation will be undertaken before construction begins.

No mineral rights have been leased within the exclusion area, and there are no outstanding mineral rights that could result in the production of either surface or subsurface minerals at the LNP site. However, a brick manufacturing facility

operates in the vicinity. No LNP-related construction activities will significantly affect the operation of this facility, nor will they affect existing mineral rights or land use at the brick manufacturing operation.

4.1.1.1.2.2 Off-Site Indirect Land Use Changes

ER Subsection 4.1.2 discusses the direct impacts of the LNP transmission corridors and other off-site features. Figure 2.1-2 illustrates these facilities in relation to the vicinity, which is primarily mixed forest lands (29 percent of the total vicinity area), forested wetlands (18 percent), and evergreen forest lands (18 percent). Other land uses representing greater than 5 percent of the vicinity include residential lands (9 percent) and deciduous forest lands (6 percent). As detailed in the following subsections, construction activities will not significantly affect land use in nearby communities or in the greater region.

Land use impacts on nearby communities or properties would be the result of an increased construction labor force (up to 2700 new employees) in the area. Up to 50 percent of the construction labor force may opt to relocate to the vicinity. However, based on the discussion in ER Subsection 2.5.2 and ER Section 4.4, adequate property and community services are available to support relocated workers. It is anticipated that minimal infrastructure and/or expanded development will be required to accommodate their needs. As discussed in detail in ER Section 4.4, a significant amount of the labor force needed for construction of the LNP would not permanently relocate to the vicinity but would commute from within the region.

Normal recreational practices near the LNP site will not be altered during construction with the exception of the cessation of historical hunting practices on the site. However, hunting and fishing are available in other parks and recreational areas throughout the region as discussed in ER Subsection 4.4.2.6.

4.1.1.1.2.3 Land Use Plans

This subsection summarizes the federal, state, or regional land use plans relevant to the site and vicinity. Construction at the LNP site and in the vicinity will primarily affect Levy, Marion, and Citrus counties. Although eight counties are within the region, only three counties could be primarily affected by construction at the LNP site. Planning and development activities within these counties — Levy, Marion, Citrus — are discussed in the following subsections along with other future land use components such as DRIs and PUDs that are also indicative of future development trends (Figure 4.1-3) (References 4.1-006 and 4.1-007). ER Subsection 2.2.2.6 discusses the county comprehensive and future land use plans in detail. Figure 4.1-2 illustrates the projected future land uses for the LNP on-site and off-site components.

Figure 4.1-3 illustrates the DRIs and PUDs in the LNP vicinity and region, which are generally indicative of future development trends. A DRI is defined as any development which, because of its character, magnitude, or location, would have a substantial effect on the health, safety, or welfare of citizens in more than one

county. (References 4.1-006 and 4.1-007) Table 4.1-1 summarizes the eight DRI applications received by FDCA in the region since 2000, all of which are located outside of the LNP site and three vicinity counties listed above. A PUD is a self-contained development in which the subdivision and zoning controls are applied to the project as a whole rather than to individual lots, as is the case in most subdivisions, to provide more flexibility than conventional zoning. A combination of diverse land uses, such as housing, recreation and shopping may be accommodated within a single development, and buildings may be clustered on smaller lots, permitting the preservation of natural features in common areas or open park-like areas (Reference 4.1-007). Table 4.1-2 summarizes the 575 PUDs (45,672 ha [112,587 ac.]) located within the region by planning agency. While there are no PUDs on-site and one in the vicinity, a 2.9-ha (7.2-ac.) PUD is located in Marion County on the border it shares with Levy County, directly east of the LNP (Figure 4.1-3). Additionally, public comment testimony related to the Levy County Large Scale Plan Amendment indicated that a developer was planning to develop 2703 ha (5700 ac.) next to the plant with 1250 residential sites ranging in size from 0.2 to 8.1 ha (0.5 to 20 ac.).

The Marjorie Harris Carr Cross Florida Greenway (CFG) Management Plan, completed in 2007, describes the natural resources and intended management of the CFG. The land was acquired through a transfer agreement between the federal government and the State of Florida, Preservation 2000 funds, Florida Forever funds, and donations. The management plan was developed based on the statutes and rules that define the purposes for which the CFG was acquired. (Reference 4.1-012)

New recreational facilities and improvements to the existing areas and trails along the CFG have been proposed for the next 5 to 10 years. An extension of the Withlacoochee Bay Trail and a proposed trail to connect the Inglis Lock area with Dunnellon along the Lake Rousseau shoreline will enhance recreational opportunities and improve connections between managed areas (Figure 4.1-5). The addition of the Eagle's Nest campground on Inglis Island with an anticipated 30 to 60 campsites is being evaluated, and a 30-year lease to Citrus County has been planned for a boat ramp on U.S. Highway 19 (US-19). A visitor center is also proposed near Felburn Park on the western end of the CFG. Overall, new emphasis will be placed on loop and paved trails to accommodate the more casual user. The funding and existing partnerships for these projects involve the Florida Department of Transportation (FDOT), Felburn Foundation, University of Florida Fisheries Department, U.S. Fish and Wildlife Service (USFWS), and the involved counties and towns (primarily Citrus and Marion counties). (Reference 4.1-012)

The Florida Ecological Greenways Network (FEGN) began studying and prioritizing critical linkages, which are crucial for protecting connected landscapes, in November 2005. Studies of critical linkages determine the most important areas to link with existing conservation areas and wildlife corridors for a variety of species. The 2005 update of the linkage prioritization was needed to address changes in the base boundary of the FEGN adopted by the Florida Greenways and Trails Council in 2004. The FEGN strives to identify opportunities

to protect intact landscapes important to the overall conservation of Florida's biodiversity and ecosystem services. (Reference 4.1-013)

The Florida Forever Board of Trustees (formerly known as CARL projects) plans to acquire lands with outstanding natural resources, with opportunities for natural resource-based recreation, or for the historical and archaeological resources found therein. Florida Forever conducted an inventory in December 2007 and mapped all the properties the board wishes to acquire with the aim of conserving the lands in perpetuity. (Reference 4.1-014)

Paddling trail opportunities were first identified by the Office of Greenways and Trails in the 1999 Implementation Plan adopted by the Florida Legislature. The Greenways and Trails Implementation Plan for prioritizing paddling trail opportunities was completed in May 2004. Paddling trail segments studied and prioritized included trails not previously designated or part of the Florida Circumnavigational Trail. (Reference 4.1-015)

Impacts from construction on current land use plans in the LNP site and vicinity will be SMALL, short term, and minimal.

4.1.1.2 Short-Term Physical Changes in Land Use and Mitigation

Mitigation measures designed to lessen the impact of construction activities will be specific to erosion control, controlled access roads for personnel and vehicle traffic, and restricted construction zones. The LNP site preparation work will be completed in two stages. The first stage will consist of stripping, excavating, and backfilling the areas occupied by structures and roadways. The second stage will consist of developing the LNP site with the necessary facilities to support construction, such as construction offices, warehouses, trackwork, large unloading facilities, water wells, construction power, and construction drainage.

Stormwater runoff from the LNP site will be collected and controlled by a stormwater drainage system. The three drainage ponds on the LNP site affect 36.2 ha (89.5 ac.). After site grading, a series of stormwater drainage features will be constructed within the plant site to drain the stormwater to three stormwater detention ponds located around the LNP site. Site drainage will be maintained through a series of features such as pipes, open ditches, culverts, and storm sewers.

Given the scale and quality of the land use changes discussed in ER Subsection 4.1.1.1, the land use impacts associated with the construction of the LNP site will be SMALL. ER Section 4.6 discusses associated measures and controls to limit environmental impacts.

4.1.1.3 Construction Impacts on the Geologic Environment

As described in ER Subsection 2.2.1.2, Mineral Resources, no active quarrying or mining facilities are located within the 9.7-kilometer (km) (6-mile [mi.]) radius of the LNP site. Gulf Rock, Inc., is an inactive mine located 6.3 km (3.9 mi.) from

the LNP site. Tarmac America, LLC, is planning a mining operation, Tarmac King Road Limestone Mine, within 8 km (5 mi.) of the LNP site, approximately 1.6 km (1 mi.) west of US-19 (Reference 4.1-016). The proposed facility plans to mine approximately 12.1 ha (30 ac.) of the 1942.5-ha (4800-ac.) tract annually for the next century. Tarmac America, LLC estimates that the King Road Limestone Mine will utilize less than 1 mgd of water and will generate approximately 500 truck trips entering US-19/US-98 at King Road each day (Reference 4.1-017). The USACE anticipates that the Environmental Impact Statement (EIS), triggered by their Section 404 review of the project's permit application, will result in a Record of Decision in the summer of 2009 (Reference 4.1-016).

No mineral rights have been leased within the exclusion area, and there are no outstanding mineral rights that could result in the production of either surface or subsurface minerals at the LNP site. Because LNP-related construction activities will neither affect the operation of an active quarry or mine, nor will they affect existing mineral rights, impacts on the geologic environment are expected to be SMALL.

4.1.2 TRANSMISSION CORRIDORS AND OFF-SITE AREAS

This subsection assesses the direct impacts of construction on land use within all LNP corridors, including those within the site and vicinity, and all off-site areas; it builds on the information found in ER Subsection 2.2.2. Where necessary and appropriate, consideration that is given to alternative routing, location, or construction practices that would mitigate adverse environmental impacts are discussed. For the purposes of this subsection, transmission corridors include the south transmission line corridor leaving the site, as well as the individual 500-kV transmission line corridors as they exit the south transmission line corridor and connect with two high-voltage substations and a 500-kV switchyard east and south of the LNP site at the Crystal River Energy Complex (CREC). Off-site areas include the heavy haul road, barge slip access road, anticipated barge slip, proposed rail line, makeup and blowdown pipeline corridor including the associated cooling water intake and discharge structures.

4.1.2.1 Transmission Corridors

The transmission corridors discussed in this subsection include the south transmission line corridor leaving the site, as well as four major 500-kV transmission lines. As discussed in detail in ER Subsection 2.2.2 and ER Section 3.7, two of the major lines will connect to the proposed Citrus Substation, one line to the proposed Central Florida South Substation, and one to the existing CREC 500-kV switchyard. Additional system upgrades will be constructed by PEF to accommodate demand in the central and south Florida areas primarily served by the LNP. Detailed descriptions of the transmission line system and associated environmental impacts are described in ER Subsection 2.2.2 and ER Section 3.7. Corridors are defined as transmission line routes of variable widths which are sufficient to contain the eventual ROWs (NUREG-1555, Section 3.71[a]). Several new transmission line corridors will be

required to integrate the LNP to the Florida electrical grid system as described in ER Subsection 2.2.2 and ER Section 3.7.

PEF has not precisely defined or located the potential ROWs that will be located within the transmission line corridors; however, Tables 2.2-4, 2.2-5, and 2.2-6 summarize the anticipated land use changes based on the corridors described in ER Subsection 2.2.2.

The actual ROW width and alignment within the corridors will depend on adjacent land uses, property boundaries, ownership patterns, structure types and height and span lengths. Acreages of land uses and vegetative communities for the transmission line corridors are provided in ER Subsection 2.2.2. Typical structure types, height, and span lengths of the proposed transmission line structures are provided in ER Section 3.7.

In general, line construction activities will include erosion control, ROW preparation, construction and placement of foundations, assembly and erection of structures, and installation of conductors.

In its ROW selection and construction of the new lines, PEF will minimize effects on human populations, water bodies and wetlands, archaeological and historic sites, vegetation, and wildlife to the extent practicable by complying with state and federal regulatory requirements, including the specifications in the current FDOT Utility Accommodation Manual. To the extent PEF is able to locate the proposed transmission lines, either wholly or partly, within existing ROWs, the use of adjacent undisturbed areas will be minimized.

In general, the entire width of the ROW will be completely cleared except in wetlands. For areas where existing ROW widths are insufficient for placement of the proposed transmission lines, additional clearing will be necessary. Clearing will be in accordance with the descriptions shown below, and will be determined by existing conditions, environmental constraints, and line design requirements.

PEF is seeking certification of the corridors pursuant to the Florida Electrical Power Plant Siting Act (PPSA), Chapter 403, F.S., and Chapter 62-17, Florida Administrative Code (F.A.C.). The certification provides for the centralized and coordinated permitting of the LNP, as well as the associated facilities, including the associated transmission lines included in this application. For linear facilities associated with an electrical power plant, such as the proposed transmission lines, the PPSA provides for the certification of "corridors," which is the area within which the associated linear facility ROW must be located. Certification under the PPSA is the sole license of the State of Florida and nonfederal agency approval of the location of the LNP, associated facilities, and transmission corridors, and authorizes construction and maintenance of the transmission lines. The actual ROW width and alignment within the corridors will depend on adjacent land uses, property boundaries, ownership patterns, structure types and height and span lengths as discussed in ER Subsection 2.2.2.

Impacts on land use associated with the construction of transmission corridors and related substations and switchyard are anticipated to be SMALL.

4.1.2.1.1 Clearing in Upland Areas

Vegetation in upland areas will be cleared to ground level. Stumps will either be cut or ground down to natural grade and treated with an approved herbicide to prevent regrowth, or the entire stump and root mat will be grubbed to 15.24 centimeters (cm) (6 inches [in.]) below grade. All holes resulting from the removal of stumps will be refilled to natural grade. Chipping material will be spread up and down the ROW, not to exceed 15.24 cm (6 in.) in depth, unless specific landowner restrictions require them to be removed and disposed of off-site. Limbs, brush, stumps, and cleared debris may be piled and burned within the limits of the ROW in compliance with the appropriate state and local regulations.

4.1.2.1.2 Clearing in Wetland Areas

Vegetation in wetland areas will be cleared using restrictive clearing techniques. Restrictive wetland clearing will be done by hand, usually with chain saws, or with low-ground pressure shear or rotary machines to reduce soil compaction and damage to vegetation. These methods may be used alone or in combination, as may be necessary for specific sites. Restrictive clearing will consist of the cutting and removal of all trees and growth with a mature height greater than 3.7 m (12 ft.), leaving all other vegetation in the ROW outside of the access road and structure pad areas. Trees will be cut to as low as possible or to existing water level. Stumps may be left in place to preserve the root mat, and treated with an approved herbicide to prevent regrowth. All trees and debris will be removed from the ROW and disposed of in upland areas or off-site depending on landowner restrictions. The cut material will be removed from the wetland using either low ground pressure equipment or temporary construction mats. Care will be taken at all times to minimize rutting and disturbance of the root mat.

The ROW in wetland areas will be cleared in expectation that they will be maintained in an herbaceous state.

Tree stumps under the conductors and in the cleared work areas at the structure sites will be removed, sheared, or ground to 15.24 cm (6 in.) below the ground line to allow for the installation of access roads and structure pads, as well as general travel and related construction activities.

If practicable, an 8-m- (25-ft.-) deep foliage screen of existing vegetation with mature heights not exceeding 3.7 m (12 ft.) will be left intact at locations where the ROW crosses a navigable waterway.

4.1.2.2 Off-Site Areas

Table 4.1-5 summarizes the off-site land use changes anticipated by construction of the LNP by general component (Figure 4.1-1). A total of 441.1 ha (1090 ac.),

or 1.5 percent of the LNP vicinity area will be affected during construction, including the following components, which are discussed and are further described in the next subsections, unless otherwise noted:

- Heavy haul road and barge slip access road south from the site (28.2 ha [69.7 ac.]).
- Anticipated barge slip along the Cross Florida Barge Canal (CFBC) (0.2 ha [0.6 ac.])
- Proposed rail line going east from the site (131.3 ha [324.4 ac.]).
- Blowdown pipeline corridor (46.8 ha [115.6 ac.]) and associated cooling water intake structure (0.4 ha [1.1 ac.]).
- Makeup pipeline corridor (27.5 ha [68.0 ac.]).

The majority, 63 percent, of the affected land is forested, 18 percent are wetlands, 9 percent is developed, and 8 percent are general agricultural lands. Impacts from construction on off-site area land use in the LNP vicinity will be SMALL and minimal.

4.1.2.2.1 Heavy Haul Road and Barge Slip Access Road

The heavy haul road will be constructed specifically to transport equipment and materials. The heavy haul road extends north from County Road (CR-40) to the LNP site. The barge slip access road extends from CR-40 south to the anticipated barge slip. Table 4.1-5 shows that the heavy haul road and the barge slip access road will primarily affect mixed forested lands (16.9 ha [41.8 ac.]), forested wetlands (4.4 ha [10.9 ac.]), and other agricultural lands (3.5 ha [8.7 ac.]). The land use will change to a transportation, communications, and utilities land use, as illustrated in Figure 4.1-1.

Stormwater runoff will be diverted away from the roadways near the LNP site by constructing swales along the roads. These swales will be constructed on the sides of the roadway to provide essential drainage and water quality treatment. Roadways and swales will be designed using FDOT design standards. Overflow from these swales will discharge to surrounding lands as sheet flow to reduce the potential for erosion. Cross drains under roadways will be designed to equalize the water levels on both sides of the roads around the plant site.

For the purposes of LNP on-site construction, the PPSA certification will address stormwater permit requirements typically included in the state Environmental Resource Permit (ERP). Federal stormwater construction site permitting will be obtained by using the Generic Permit for Stormwater Discharge from Large and Small Construction Activities, which is also administered by the Florida Department of Environmental Protection (FDEP). Site grading and drainage during site preparation activities will be designed to mitigate erosion and comply

with a comprehensive erosion and sedimentation control plan (E&SCP) and a Stormwater Pollution Prevention Plan (SWP3), which are required by FDEP to comply with the generic permit. These plans will be written and approved for the LNP prior to the start of site grading and construction activities.

4.1.2.2.2 Barge Slip

Construction of the LNP will utilize an anticipated barge slip being considered on the CFBC (Figure 4.1-1). The new slip will be located on the northern bank of the CFBC at the end of the proposed barge slip access road. Creation of the new barge slip will require dredging of 0.45 ha (1.1 ac.) below mean high water (MHW) and excavation of 0.41 ha (1 ac.) above MHW, which will result in a change in land use of 0.85 ha (2.1 ac.) from Mixed Forest Land to Streams and Canals. It is anticipated that this will have limited impact on surrounding land use because these lands are not unique to the vicinity. It is estimated that 83,044 cubic yards (yd^3) (63,491 cubic meters [m^3]) of material will be excavated for the barge slip of which 23,260 yd^3 (17,784 m^3) will be dredged material 23,260 yd^3 (17,784 m^3) of dredged material will require disposal. ER Subsection 4.2.1.5 addresses the disposal of any dredge spoil materials that are created as a result of construction activities in wetlands or other water bodies.

4.1.2.2.3 Proposed Rail Line

The short rail line will be constructed east from the LNP site to an existing, but currently disused rail bed owned by PEF, and then south to connect with an existing railroad line. The LNP rail spur will be used to transport heavy construction materials and equipment during construction activities and for certain future LNP operations requiring rail service. It will change the land use of 132.1 ha (326.1 ac.), or 0.5 percent of the LNP vicinity to a transportation, communications, and utilities land use, as illustrated in Figure 4.1-1. Table 4.1-5 shows that the proposed rail line will primarily affect forested lands (97.9 ha [241.9 ac.]), wetlands (15.6 ha [38.5 ac.]), and residential lands (4.3 ha [10.6 ac.]). Impacts from construction on current land use in the proposed rail line will be SMALL.

4.1.2.2.4 Makeup and Blowdown Pipeline Corridors and Associated Structures

A makeup water pipeline and corridor will connect the CFBC and the LNP, while a blowdown pipeline and corridor will connect the LNP to the CREC resulting in 46.8 ha (115.6 ac.) of land use changes, or 0.2 percent of the vicinity, to land already used for other urban or built-up purposes (Table 4.1-5 and Figure 4.1-1).

Operations at the LNP will require makeup water from the CFBC. The construction of an LNP makeup water system intake structure and LNP makeup water system pumphouse on the CFBC is proposed. The intake structure will be located approximately 11.1 km (6.9 mi.) from the Gulf of Mexico on the berm that forms the north side of the canal and is within 0.8 km (0.5 mi.) of the Inglis Lock. The cooling water intake structure (CWIS) consists of the intake structure,

vertical bar screens, traveling screens, pumps, and pumphouse. The makeup water pumphouse at the intake location affects 0.4 ha (1.1 ac.) of land already used for transportation, communications, and utilities (Table 4.1-5).

Cooling tower blowdown from a series of on-site mechanical draft cooling towers, including residual waste heat, will be transported in two pipelines (one for each unit) from the LNP. The two pipes, one per unit, will carry blowdown from the cooling towers to the proposed discharge location at the CREC. These two pipes will follow a pipeline corridor located in Levy and Citrus counties to reach the discharge location.

Impacts from construction on current land use in the pipeline corridors and off-site areas will be SMALL, short-term, and minimal.

4.1.2.3 Short-Term Physical Changes in Land Use and Mitigation

Mitigation measures designed to lessen the impact of construction activities will be specific to erosion control, controlled access roads for personnel and vehicle traffic, and restricted construction zones. The LNP corridor preparation work will be completed in two stages. The first stage will consist of stripping, excavating, and backfilling the areas occupied by structures and roadways. The second stage will consist of developing the LNP corridors and off-site areas with the necessary facilities to support construction, such as construction offices, warehouses, trackwork, large unloading facilities, water wells, construction power, and construction drainage.

Stormwater runoff from the LNP corridors will be collected and controlled by a stormwater drainage system, which will include a series of pipes, open ditches, culverts and storm sewers. Given the scale and quality of the land use changes discussed in ER Subsections 2.2.2 and 4.1.2.1, the land use impacts associated with the construction of the LNP corridors will be SMALL. ER Section 4.6 discusses associated measures and controls to limit environmental impacts.

4.1.3 HISTORIC PROPERTIES

This subsection provides an assessment of the potential impacts of the proposed construction activities on historic properties on the LNP site and associated facilities, and within the respective Areas of Potential Effect (APEs) for archaeology and structures. It builds on the information found in ER Subsection 2.5.3.

4.1.3.1 Historic Properties within the LNP Site and Associated Facilities

Cultural resource investigations conducted in 2007 and 2008 determined that the LNP site APEs did not include any resources that were listed in or eligible for listing in the National Register of Historic Places (NRHP). The surveys also covered the proposed construction areas for the property south of the LNP site (including the heavy haul road, transmission corridor, and the makeup and blowdown pipeline corridor) and the off-site blowdown pipeline. Based on a

review of the Florida Master Site File (FMSF) records, no previously recorded resources of local, regional, or state significance were located in the LNP site, or in the above-listed construction areas (References 4.1-018 and 4.1-019). See ER Subsection 2.5.3 for further detail on the 2007 and 2008 cultural resource surveys. The survey findings have not yet been submitted to the FL State Historic Preservation Officer (SHPO) for concurrence. The technical report with the archaeological and standing structure findings, as well as eligibility recommendations, will be submitted by PEF to the SHPO for comment and concurrence prior to submittal of the Combined License Application (COLA). PEF will coordinate with the SHPO as part of the permitting process. Field surveys will be conducted on the proposed transmission line corridors and the LNP rail spur after the routes have been finalized and before construction activities begin, in accordance with federal regulations.

4.1.3.2 Previously Surveyed Properties within 15 Km (9 Mi.) of the LNP Site

A review of FMSF records in October 2007 showed 197 previously surveyed archaeological sites within a 15-km (9-mi.) radius: 101 in Levy County, 75 in Citrus County, and 21 in Marion County. Of the 197 previously surveyed sites, 32 have been determined ineligible for listing in the NRHP by the SHPO; 24 sites showed insufficient information to make a determination; two sites were recommended for more work by the surveyor but were not yet evaluated by the SHPO; 82 were recommended ineligible by the surveyor but had not yet been evaluated by the SHPO; and 49 had not been evaluated by the surveyor or by the SHPO. Eight sites were recommended eligible for listing in the NRHP by the surveyor, but had not been evaluated by the SHPO. Of those, only four are in Levy County, and all but one of them is located more than 8.1 km (5 mi.) from the LNP site. The Tidewater site (LV0253) is approximately 6.4 km (4 mi.) from the LNP site. The others, more than 8 km (5 mi.) from the LNP site, are the Spring Run Burial Ground (LV0469), located along the western coast, the Sand Slough Burial Mound (LV00250), and the Goethe site (LV00259). None of these sites are located within the APE and none have been determined eligible for listing in the NRHP. It is customary not to publish the locations of potentially sensitive archaeological sites. (Reference 4.1-020)

The Knotts Supply Company Store (LV00707) at 6302 Riverside Drive in Yankeetown, Levy County, was constructed in 1920, with a later addition to the north side of the building from 1940. It was built to serve as a general store, post office, and lumber yard office, and continues to fulfill a commercial use as a real estate office. It is a simple, balloon-framed structure with a rectangular footprint and a gable roof. It sits on a concrete block foundation. Next door is the former Yankeetown Post Office (LV00708), at 6304 Riverside Drive. It was constructed in 1926 in the same style as the Knotts Supply Company Store. Like its neighbor, it is a simple, balloon-framed structure with a rectangular footprint and a gable roof on a concrete block foundation. The primary decorative features of both buildings are wood slat gable vents, and palm tree posts supporting the shed roofs of the front porches. No significant archaeological sites were identified when the buildings were surveyed in February 2007. At that time, they were

recommended as eligible for the NRHP for architectural significance, and for significance related to the history of the commerce of the area at the local level. SHPO agreed they were potentially eligible on May 1, 2007. (Reference 4.1-021) See Figure 2.5-13 for the locations of LV00707 and LV00708.

4.1.3.3 Inadvertent Discovery of Human Remains

If human remains are discovered during survey or site development, all work in the near vicinity of the human remains will cease and reasonable efforts will be made to avoid and protect the remains from additional impact. When human remains are encountered, federal and state guidelines must be followed, including those contained in the Native American Graves Protection and Repatriation Act of 1990 (on federal land) and Chapter 872.05, F.S. (on state-owned or privately owned land). Regardless of which law takes precedence, consultation with the SHPO (or the State Archaeologist in the case of Chapter 872.05, F.S.) and appropriate interested parties will occur to determine appropriate treatment and disposition of the remains.

4.1.3.4 Impacts of Construction on Historic Properties

Impacts from construction on historic properties are anticipated to be SMALL. Results of 2007 and 2008 archaeological and architectural resource surveys (see ER Subsection 2.5.3) indicate that the LNP site lies within an area of low probability for containing significant archaeological resources, and that the survey areas contained no structures that are listed in or eligible for listing in the NRHP. The survey did not identify any NRHP-eligible cultural resources within the respective APEs on the LNP site, the property south of the LNP site, or along the blowdown pipeline. No properties listed or eligible for listing in the NRHP will be affected by the proposed construction activities in the areas surveyed (Reference 4.1-018). This does not include the proposed rail spur or the off-site transmission line corridors.

PEF has guidelines for employees and contractors designed to protect historic sites, historic landmarks, and artifacts or archaeological sites during land-disturbing activities. If a project or work activity inadvertently uncovers an archaeological site or other historical artifacts, activities in the site area will be halted, and the appropriate PEF Environmental Support Organization (ESO) will be contacted. For the LNP project, PEF's Environmental Health and Safety Services (EHSS) would be contacted. In the event of an inadvertent find, a cultural resource assessment would be performed, and EHSS would consult with the SHPO, as necessary, to determine appropriate steps to be taken prior to resuming site activities. PEF will coordinate directly with the Florida SHPO to determine appropriate mitigation or other measures, as needed, in accordance with federal and state regulations and PEF policy.

4.1.4 REFERENCES

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4.1-017 Townsend, Al, "Retain Local Control Over Mining," The Ledger, Website, www.theledger.com/apps/pbcs.dll/article?AID=/20080419/COLUMNISTS03/804190385/1110/RSS14&source=RSS&te, accessed on May 13, 2008.

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4.1-020 Florida Division of Historical Resources, Florida Master Site File, October 2007.

4.1-021 Southarc Inc., Wayne, Lucy B., "Yankeetown Seig Parcels – Phase I," March 2007.

Table 4.1-1
Developments of Regional Impacts Since 2000 for LNP Region

FDCA DRI Identification Number	Project Name	Local Government	Development Order Status	Type 1	Size 1	Unit	Type 2	Size 2	Unit
2001-006	Alachua West	Alachua City	Project Denied	Industrial	946	AC	Office	1417500	GSF
2005-020	Sunrise	Hernando County	Pending	Residential	4800	DU	Retail	430000	GSF
2005-021	Hickory Hill	Hernando County	Approved With Conditions	Residential	1750	DU	Retail	50000	GSF
2006-036	Lake Hideaway	Hernando County	Pending	Residential	3700	DU	Retail	180000	GSF
2001-002	Harbor Hills	Lake County	Pending	Residential	773	AC	Retail	17	AC
2007-007	Secret Promise	Leesburg City	Pending	Residential	9211	DU	Industrial	3827	GSF
2007-001	Renaissance Trails	Sumter County	Pending	Residential	4500	DU	Retail	315000	GSF
2007-030	Wildwood Springs	Wildwood City	Pending	Retail	215000	GSF	Residential	3000	DU

Notes:

AC = acre
DRI = Development of Regional Impact
DU = dwelling unit
FDCA = Florida Department of Community Affairs
GSF = gross square feet

Source: Reference 4.1-006

Table 4.1-2
Planned Unit Developments by Agency for LNP Region

PUD Administrating Agency	Hectares
MARION COUNTY	4438
WITHLACOOCHEE REGIONAL PLANNING COUNCIL	1669
ALACHUA COUNTY	3819
CITY OF ALACHUA	413
CITY OF GAINESVILLE	1107
EAST CENTRAL FLORIDA REGIONAL PLANNING COUNCIL	1236
HERNANDO COUNTY	5609
LAKE COUNTY	115
PASCO COUNTY	2044
SHPO SURVEYS OCT06	235
SUMTER COUNTY	5604
SWFWMD	18,432
TAMPA BAY REGIONAL PLANNING COUNCIL	953
Grand Total	45,672

Source: Reference 4.1-007

Table 4.1-3
Federal Sources Consulted for Various Special Land Types

Special Land Type	Federal Statute	Site	Vicinity	Chapter 4
Coastal Zones	Coastal Zone Management Act (16 United States Code [USC] 1451-1464) National Oceanic and Atmospheric Administration regulations implementing the Coastal Zone Management Act (15 Code of Federal Regulations [CFR] 923)	Y	Y	See Appendix 10.2.7 of the LNP Florida Site Certification Application (SCA).
Farmland	Farmland Protection Policy Act (7 USC 4201) U.S. Department of Agriculture regulations implementing the Farmland Protection Policy Act (7 CFR 658) Council on Environmental Quality (CEQ) memorandum on “Analysis of Impacts on Prime and Unique Agricultural Lands in Implementing the National Environmental Policy Act” (45 CFR 59189)	N	N	Not applicable See ER Subsection 2.2.1
Floodplains	Executive Order 11988, “Floodplain Management” (42 CFR 26951) U.S. Water Resources Council, “Floodplain Management Guidelines” (40 CFR 6030)	Y	Y	See ER Subsections 4.1.1.1.2.1 and 4.2.1, Figure 4.1-4
Wetlands	Executive Order 11990, “Protection of Wetlands” (42 FR 26961) as amended by Executive Order 12608 (52 CFR 34617)	Y	Y	See ER Subsections 4.1.1.1.2.1 and 4.3.1
Wild and Scenic Rivers	Wild and Scenic Rivers Act (16 USC 1271-1287) CEQ memorandum on “Procedures for Interagency Consultation to Avoid or Mitigate Adverse Effects on Rivers in the Nationwide Inventory” (45 CFR 59191-59192)	N	N	

Table 4.1-4
LNP On-Site Land Use Impacts by Major Component (in Hectares)

USGS Land Use	LNP 1, LNP 2, and Associated Cooling Towers (2)	500-kV Switchyard	Site Access Roads	Drainage Ponds	Total On-Site Impacts
Forested Wetland	2.7	2.9	1.7	8.0	15.3
Mixed Forest Land	2.5	15.6	7.7	25.1	50.8
Nonforested Wetland	0.3	0.1	0.2	0.2	0.8
Other Agricultural Land	9.2	0.9	2.1	3.0	15.2
Transportation, Communications, and Utilities	--	--	0.2	--	0.2
Total (hectares)	14.8	19.5	11.7	36.2	82.2

Sources: References 4.1-001 and 4.1-002

Table 4.1-5 (Sheet 1 of 2)
LNP Off-Site Land Use Impacts by Major Component (in Hectares)

USGS Land Use	Heavy Haul Road and Barge Slip Access Road	Barge Slip	Proposed Railroad	Makeup Water Pumphouse Units (2)	Transmission Line Corridor to the CFBC	Blowdown Pipeline Corridor from CFBC to CREC	Blowdown and Makeup Pipeline Corridors from LNP to CFBC	Total Off-Site Impacts
Cropland and Pasture	--	--	6.8	--	--	--	--	6.8
Deciduous Forest Land	0.2	--	8.8	--	6.7	1.4	0.5	17.6
Evergreen Forest Land	0.8	--	30.5	--	7.2	0.5	0.6	39.6
Forested Wetland	4.4	--	6.2	--	40.4	0.8	5.6	57.4
Lakes	--	--	< 0.1 ha	--	--	--	--	--
Mixed Forest Land	16.9	--	58.6	--	129.5	--	16.4	221.4
Mixed Rangeland	--	--	4.3	--	--	--	--	4.3
Nonforested Wetland	1.1	--	9.4	--	6.2	4.4	1.2	22.3
Other Agricultural Land	3.5	--	0.5	--	15.9	--	2.5	22.4
Other Urban or Built-up Land	0.8	0.2	--	--	--	29.9	0.3	31.3
Reservoirs	--	--	0.4	--	--	0.9	--	1.3
Residential	--	--	4.3	--	--	--	--	4.3
Shrub and Brush Rangeland	--	--	1.5	--	--	1	--	2.5
Streams and Canals	< 0.1 ha	--	--	--	--	0.7	--	0.7
Strip Mines, Quarries, and Gravel Pits	--	--	--	--	--	0.9	--	0.9
Transitional Areas	--	--	--	0.8	--	--	--	0.8

Table 4.1-5 (Sheet 2 of 2)
LNP Off-Site Land Use Impacts by Major Component (in Hectares)

USGS Land Use	Heavy Haul Road and Barge Slip Access Road	Barge Slip	Proposed Railroad	Makeup Water Pumphouse Units (2)	Transmission Line Corridor to the CFBC	Blowdown Pipeline Corridor from CFBC to CREC	Blowdown and Makeup Pipeline Corridors from LNP to CFBC	Total Off-Site Impacts
Transportation, Communications, and Utilities	0.5	--	--	0.4	--	6.3	0.3	7.5
Total	28.2	0.2	131.3	1.2	205.9	46.8	27.5	441.1

Notes:

ha = hectare

Sources: References 4.1-001 and 4.1-002

4.2 WATER-RELATED IMPACTS

This section describes the potential hydrologic alterations (ER Subsection 4.2.1) and water use impacts (ER Subsection 4.2.2) that may result from construction of the following infrastructure at the LNP site:

- Reactor Units LNP 1 and LNP 2.
- Makeup and blowdown pipeline corridor.
- Cooling water intake and discharge structures.
- 500-kV switchyard.
- Auxiliary buildings 115, 114, 114A, 169, and 141.
- Drainage ponds A, B, and C (C1 and C2).
- Railroad tracks and corridor.
- South transmission line corridor.
- Heavy haul road and barge slip access road.

The LNP site is located in southwestern Levy County, Florida, and encompasses an area of approximately 1257 ha (3105 ac.). The Gulf of Mexico is located approximately 12.8 km (7.9 mi.) west of the site, and Lake Rousseau is approximately 4.8 km (3.0 mi.) south of the site (Figure 4.1-2). As part of the proposed construction, a 304.8-m (1000-ft.) wide transmission corridor will be constructed from the southern border of the site. A construction corridor approximately 45.7-m (150-ft.) wide will also be constructed in a southerly direction from the southern border of the site to the CFBC. This corridor will be used for site access and movement of equipment and supplies. A 45.7-m (150-ft.) wide corridor for the makeup and blowdown pipelines will be constructed adjacent to the construction corridor (Figure 2.1-2). Construction of the blowdown pipeline will also include construction along the CFG State Recreation and Conservation Area, across the CFBC, and adjacent to the Crystal River State Buffer Preserve. The blowdown pipeline will connect to an existing discharge canal located at the CREC.

Several public trust lands, including natural and preserve areas, are within close proximity to the LNP site, including the Big Bend Seagrasses Aquatic Preserve, the Crystal River Preserve State Park, the Waccasassa Bay Preserve State Park, and the Goethe State Forest (Figure 2.4-7).

The LNP site is located in the SWFWMD and is within the Waccasassa River and Withlacoochee River drainage basins (Figure 2.3-4). There are no named streams at the LNP site. Runoff from the site is primarily overland, with storage

provided by wetlands. The general direction of overland flow is to the southwest toward the Lower Withlacoochee River and the Gulf of Mexico (Reference 4.2-001).

Proper mitigation and management methods implemented during construction will limit the potential water quantity and quality effects on surface water bodies (that is, Lake Rousseau, Withlacoochee River, Inglis Lock Bypass Channel, CREC discharge canal, and the CFBC) and groundwater. The hydrologic effects of plant operations are addressed in ER Section 5.2.

4.2.1 HYDROLOGIC ALTERATIONS

This subsection identifies and describes anticipated hydrologic alterations and potential water-related effects that may result from proposed construction activities. Effects of hydrologic alterations on consumptive water use are addressed in ER Subsection 4.2.2. Hydrologic alterations may result from the following LNP site preparation and construction activities:

- Alteration of the existing watershed surface by removal of woody vegetation on the proposed site and construction corridor.
- Disturbance of the ground surface for stockpiles, material storage, and construction of temporary access roads.
- Construction of water intake and discharge structures.
- Construction of cofferdams and storm sewers.
- Construction of structures that could alter shoreline processes.
- Dredging operations.
- Temporary dewatering activities and other operations affecting water levels.
- Construction activities contributing to sediment runoff.
- Impacts on wetlands.

Potential hydraulic alterations that could result from these construction activities include:

- Changes in surface water drainage characteristics.
- Decreases of surface water infiltration (increases of impervious surfaces).
- Increased erosion and sedimentation.

- Changes in groundwater level due to stormwater pond infiltration.
- Subsidence resulting from groundwater withdrawals.

The following subsections discuss the possible hydrologic alterations and effects resulting from these construction-related activities. In addition, this discussion describes practices that will be implemented to minimize the effects of hydrologic alterations and applicable federal, state, regional, tribal, and local standards and regulations that will be implemented.

Construction erosion control measures and stormwater controls are required under the following regulations:

- F.S. Part IV, Chapter 373.
- F.A.C., Chapter 62-25.
- Federal Water Pollution Control Act, 33 United States Code (USC) 1251-1387 (also known as the CWA).
- U.S. Army Corps of Engineer's (USACE's) Section 404 wetland permit, 33 USC 1344.
- USACE's Nationwide Permit 12 on utility line crossings of streams. (Reference 4.2-002)
- Levy County Code of Ordinances. (Reference 4.2-003)
- SWFWMD District 40D Rules. (Reference 4.2-004)

These regulations will be followed during construction activities. In addition, specific erosion control measures will be implemented to minimize effects on the Withlacoochee River, Lake Rousseau, and the CFBC.

4.2.1.1 Freshwater Streams

Construction will be focused on a 121-ha (300-ac.) area where the plant will be located, but construction activities will not be limited to the site. Construction materials will be brought to the plant site using the CFBC, the heavy haul road, and barge slip access road (Figure 2.1-2).

No known streams or creeks are located within the LNP site; however, approximately 39 percent of the site is covered by wetlands. ER Subsection 2.4.1.1 details the LNP site characteristics, including wetland types and percentages. The most considerable stream related to the LNP site is the Withlacoochee River. Other possible sources of water for use at the site include groundwater for potable use.

The majority of the LNP site is located in the Waccasassa River drainage basin. The southeast corner of the site is located in the Withlacoochee River drainage basin (Figure 2.3-5). Stormwater generally flows overland in a southwest direction toward the Withlacoochee River or the Gulf of Mexico. Hydrologic alterations of the watersheds at the LNP site are expected to occur from construction activities, including filling wetlands and dewatering during excavation.

The alterations related to LNP site preparation and construction will generally increase the volume of runoff to the Withlacoochee River and could temporarily alter the quality of runoff, particularly related to sediment. The heavy haul road will cross the Withlacoochee River. However, by implementing proper erosion and sediment controls, as required by law (ER Subsection 4.2.1), these effects will be minimized.

The use of heavy equipment during construction will compact soils. Construction activities will also increase the amount of impervious surfaces at the LNP site. The usage of heavy equipment and the increase of impervious surfaces will likely result in higher rates of stormwater runoff into the Withlacoochee River and reduce the infiltration of precipitation to groundwater.

The higher rate of stormwater runoff can also increase pollutant loads to the river. Grading and construction activities may temporarily increase siltation on and immediately downgradient of the LNP site. During rainstorms, erosion from a cleared site is generally much higher than erosion from a vegetated site. However, erosion control measures, as required by permit regulations, will be implemented to minimize the amount of stormwater runoff.

The Stormwater Best Management Practice Selection and Implementation Manual and National Pollutant Discharge Elimination System (NPDES) stormwater permit requires the development of a plan to control erosion and sedimentation for construction activities that disturb 0.4 ha (1 ac. or 0.004 km^2 [0.0016 $mi.^2$]) or more of land. LNP construction will disturb more than 2 ha (5 ac. or 0.02 km^2 [0.0078 $mi.^2$]) of land and is considered a large construction activity. Therefore, the E&SCP must include control measures that prevent sediment effects on water quality. Best management practices (BMPs) must also be implemented to control sedimentation from the peak runoff generated by a 10-year storm (Reference 4.2-005).

During the site preparation and construction phases, design measures will be implemented to avoid concentrated flows that have a high potential to transport sediment. The construction of the LNP will incorporate visual inspections of construction erosion control measures to monitor their effectiveness, and to aid in determining whether other mitigation measures are necessary. In accordance with state regulations, cleared surfaces will be temporarily seeded if cleared for 30 days or more. Other cleared surfaces will be reseeded with native plants within 60 calendar days of construction completion. Twenty-meter (66-ft.) riparian

buffers from any estuary will be maintained on-site, as required by Levy County's Code of Ordinances. There are no estuaries or streams on the primary site; however, buffers will be maintained at the heavy haul construction corridor. These riparian buffers will serve as an additional protection measure. Impacts from the alteration of the existing watershed are expected to be SMALL.

By following an E&SCP and a grading plan, implementing and maintaining BMPs to control sedimentation for a 10-year storm, implementing a spill prevention plan, and protecting riparian buffers, water quality changes within surface water bodies are expected to be SMALL.

Clearing trees and plants along the shores of the Withlacoochee River, on the site, and in transmission corridors could affect the river as a result of sedimentation. These clearing activities will require permission from SWFWMD in accordance with District 40D rules (Reference 4.2-004).

Forestry BMP guidelines will be followed to minimize the effects of erosion and sedimentation. Barriers, such as silt fences, will be used to prevent sediment from reaching surface water. In addition, to the maximum extent practicable, construction activities will be scheduled to minimize the time between clearing and restoration. Ideally, the land will be divided into small manageable areas, cleared, and then reseeded where required (areas cleared for 30 days or more). Impacts related to the clearing of existing trees and vegetation on erosion and sediments are expected to be SMALL.

Corridor preparation work or construction activities may affect smaller streams and intermittent streams along the transmission corridors. Such activities may include crossing streams with pipelines, mowing, removing woody vegetation, causing temporary disturbances along access routes for construction equipment, and digging small excavations for tower and pipeline structure base pads. These structure base pads will be located in places with adequate separation from drainage ways and streams. Where construction or equipment traffic exposes soil, appropriate erosion control and revegetation methods will be applied. Disturbed areas at tower and pipeline structure base pad sites are expected to be smaller than the sizes of disturbed areas that trigger federal and state requirements for permanent stormwater management facilities. All construction will comply with Levy County's erosion and sediment control ordinances and the Florida Energy Sources Coalition (FESC) manual. Impacts related to corridor preparation and construction activities are expected to be SMALL.

Measures will be taken during construction to minimize potential impacts on surface water. The major water bodies crossed by the transmission or pipeline corridor pipelines are the Withlacoochee River, CFBC, and Inglis Lock Bypass Channel. The transmission lines will cross each water body at an approximately 90-degree angle to ensure stability and prevent erosion. Trenchless technology is a technique that can also be used to minimize impacts on surface water. However, where trenchless technology is not practicable, appropriate BMPs will be in place. These BMPs will follow USACE's guidance from Nationwide Permit

12 on utility line crossings of streams. (An individual USACE Section 404 permit will be obtained to cover the overall wetland and stream effects related to construction of the LNP.)

Construction activities will cause only temporary effects on streams. All construction will be performed in accordance with CWA Section 401 and Section 404 regulations, and Florida's regulations concerning CWA Section 401 water quality certifications.

Construction erosion and stormwater control measures will also be implemented in areas used for material staging, parking, and/or other construction-related facilities. Site work associated with construction of these areas will temporarily or, in some cases, permanently alter the existing terrain and drainage. Therefore, comprehensive construction erosion control measures will be used to minimize the potential effects of the surface water runoff. Impacts on the disturbed areas used for material staging, parking, or other construction-related facilities, in terms of soil erosion, effluent, and waste management are expected to be SMALL.

Surface disturbance from the construction of overhead transmission lines, makeup and blowdown pipelines, and associated infrastructure is expected to be limited and temporary. Such disturbance includes the removal of trees and shrubs, movement of construction equipment, and excavation for the foundations of the transmission line towers and pipeline structures. This disturbance is expected to be SMALL because the construction activities will be short-term or isolated at individual tower and pipeline base pads but will require significant removal of vegetation at the construction access. To minimize erosion, ground disturbance will be reduced, and native ground vegetation will be reestablished following grading. The E&SCP will include a buffer zone, minimally exposed slopes, and installed erosion control devices (Reference 4.2-005). Impacts associated with the construction of the overhead transmission lines, makeup and blowdown pipelines, and associated infrastructure are expected to be SMALL.

Discharges related to construction activities will be nonpoint source. All federal, state, regional, tribal, and local regulations relating to nonpoint sources will be observed. Impacts on water quality are expected to be SMALL.

The proposed area to be cleared on the LNP site and in the construction corridor is partially classified as a Zone AH floodplain. Levy County's Code of Ordinances Chapter 50, Article VI and the SWFWMD District 40D rules address construction and permitting in flood hazard areas (References 4.2-003 and 4.2-004). PEF will need to obtain an environmental resource permit from FDEP for these activities and a development permit from Levy County. All activities will comply with Levy County's Flood Damage Prevention Ordinance (Reference 4.2-006).

4.2.1.2 Lakes and Impoundments

No known lakes or impoundments are located within the LNP site; however, three wet stormwater ponds will be constructed on site. ER Subsection 2.4.1.1

details the LNP site characteristics, including wetland types and percentages. The most considerable lakes and impoundments related to the LNP site are the Inglis Lock Bypass Channel from Lake Rousseau, located 4.8 km (3.0 mi.) south of the site.

The alterations related to LNP site preparation and construction will generally increase the volume and quality of runoff to the constructed wet stormwater ponds. The use of heavy equipment during construction will compact soils. Construction activities will also increase the amount of impervious surfaces at the LNP site. The usage of heavy equipment and the increase of impervious surfaces will likely result in higher rates of stormwater runoff. However, by implementing proper erosion and sediment controls, as required by law (ER Subsection 4.2.1), these effects will be minimized.

By following an E&SCP and a grading plan, implementing and maintaining BMPs to control sedimentation for a 10-year storm, implementing a spill prevention plan, and protecting riparian buffers, water quality changes within surface water bodies can be expected to be SMALL.

Clearing trees and plants could affect the stormwater ponds as a result of sedimentation and debris. These clearing activities will require permission from SWFWMD in accordance with District 40D rules (Reference 4.2-004).

4.2.1.3 Cross Florida Barge Canal

The most considerable impoundment is the CFBC, located 5.2 km (3.2 mi.) south of the site (Figure 1.1-1). Water from the canal will be used as cooling water for the LNP. The CFBC will also be used to transport construction materials to the construction access corridor.

The alterations related to LNP site preparation and construction will generally increase the volume and quality of runoff to the CFBC. Construction of a heavy haul construction access, transmission corridors, and pipeline corridors south of the site could also affect the water quality of the CFBC. The use of heavy equipment during construction will compact soils. Construction activities will also increase the amount of impervious surfaces at the LNP site. The usage of heavy equipment and the increase of impervious surfaces will likely result in higher rates of stormwater runoff into the CFBC. However, by implementing proper erosion and sediment controls, as required by law (ER Subsection 4.2.1), these effects will be minimized.

The higher rate of stormwater runoff can also increase pollutant loads to the CFBC. Grading and construction activities could temporarily increase siltation on and immediately downgradient of the LNP site. During rainstorms, erosion from a cleared site is generally much higher than erosion from a vegetated site. However, erosion control measures, as required by permit regulations, will be implemented to minimize the amount of stormwater runoff.

During construction, potential impacts on surface water quality in the CFBC also include hydrocarbons that could emanate during the transport of heavy equipment up the canal to the LNP site, and from heavy equipment operations and maintenance. To minimize potential hydrocarbon impacts on surface water quality, PEF will prepare a spill prevention plan, which will outline the measures required to mitigate potential releases. This impact on surface water quality is expected to be SMALL.

By following an E&SCP and a grading plan, implementing and maintaining BMPs to control sedimentation for a 10-year storm, implementing a spill prevention plan, and protecting riparian buffers, water quality changes within surface water bodies can be expected to be SMALL.

Clearing trees and plants along the CFBC and in transmission corridors could affect surface water bodies as a result of sedimentation. These clearing activities will require permission from SWFWMD in accordance with District 40D rules (Reference 4.2-004).

Additional impacts could occur from construction of the blowdown pipeline beneath the CFBC.

4.2.1.4 Groundwater

Hydrologic alteration will result from construction activities including a change in groundwater levels within the LNP site resulting from grading and construction of a series of stormwater drainage ditches. After grading, a series of stormwater drainage ditches will be created around and within the construction area to direct stormwater away from LNP facilities. These stormwater drainage ditches will direct surface water into three stormwater retention/infiltration ponds, designed to drain within 5 days. Any excess rainfall will be pumped to the cooling tower blowdown basin and, if necessary, discharged with blowdown.

Although the ponds are designed to retain a 25-year, 24-hour rainfall event, larger storm events (100-year rainfall) will be drained out of the ponds through broad-crested weir emergency spillways provided in each of the ponds. A minimum freeboard of 0.6 m (2 ft.) will be provided for each pond above the spillway elevation. Water will be discharged from the spillways through long spreader swales to pass runoff to the surrounding wetland as sheet flow to prevent erosion. Because grading will increase the surface elevation of the site, potential impacts on surface water drainage characteristics and groundwater levels from the network of stormwater drainage ditches are anticipated to be SMALL. ER Subsection 3.6.3.2 has specific information about the site stormwater system.

In addition to the stormwater drainage ditches, hydrologic alterations anticipated from construction activities also include temporary changes in groundwater levels from dewatering of excavations for the proposed structures. Potential impacts

that will be considered during the design of the excavation and dewatering activities include the following:

- The amount of water that will need to be removed based on the embedment depth.
- Slope stability and subsidence issues that can occur when water is removed from the unconsolidated materials.
- The lateral extent of groundwater depressions caused by dewatering.
- The management and handling of the water removed from the excavation.
- Changes in water quality.

In accordance with the DCD, the proposed maximum embedment depth of approximately 12.2 m (40 ft.) (elevation of 3 m [10 ft.] NAVD88) is below the static water table. Temporary groundwater wells will be installed and monitored to prevent excessive dewatering effects. Detailed information pertaining to groundwater monitoring activities is discussed in ER Sections 6.1, 6.3, and 6.6.

Dewatering for the nuclear island foundation excavations will be required during construction activities. The planned depth of the excavations is approximately 75 ft. Water from the excavations will be intermittently pumped and discharged to temporary retention/settling ponds. The construction of the ponds will allow the discharged water to percolate back into the subsurface. Measures will be implemented, such as sedimentation traps or filtration, to ensure that erosion or siltation caused by the dewatering will be negligible. However, the effects of these activities will be confined to the construction period. They will be monitored and controlled using Florida BMP Selection and Implementation for sediment control (Reference 4.2-005). Proper safeguards will be implemented to prevent long-term effects on local habitats from construction activities. Potential long-term impacts on groundwater levels from dewatering are anticipated to be SMALL.

Raw water for construction activities will be withdrawn from on-site supply wells (see Figure 4.2-1). Permit approval is anticipated for four 16-in. diameter supply wells constructed to a maximum depth of 500 ft. with a minimum cased interval of 150 ft. Planned pump capacity per well is 1000 gallons per minute (gpm). The following maximum groundwater needs are estimated as follows:

- Soil compaction — 300,000 gallons per day (gpd).
- Dust and erosion control — 100,000 gpd.
- Concrete mixing — 100,000 gpd.
- Miscellaneous — 50,000 gpd.

The projected total maximum usage is 550,000 gpd and the projected average usage is 275,000 gpd.

The projected groundwater usage for LNP operations (see ER Subsection 5.2.2.3) is anticipated to have a SMALL impact. The projected construction groundwater usage is projected to be less than half the operational amount. Therefore, groundwater impacts from construction activities are also anticipated to be SMALL.

4.2.1.5 Wetlands

The LNP site is undeveloped. The developed area of the LNP site must be graded to an elevation of 15.24 m (50 ft.) NAVD88 for facility construction, as required by the DCD. The location for the LNP will require filling of the land surface, thereby altering current drainage patterns. An E&SCP will be filed for approval by Levy County and the SWFWMD (Reference 4.2-004). Upon approval of the plan, NPDES Phase II stormwater conditions for construction sites will also apply during construction and operation. Grading and drainage during construction will be designed to be consistent with the E&SCP to minimize erosion during construction, as outlined in ER Subsection 4.2.1.1.

Approximately 39 percent of the site is covered by existing wetlands (ER Subsection 2.4.1.1). Clearing vegetation around the LNP site and within the associated corridors will affect wetlands on the site. These alterations may affect the ecological and hydrologic value of the wetland. Some wetlands will need to be drained for site construction or filled to bring the plant elevation to 15.24 m (50 ft.) NAVD88, as per DCD requirements for plant floor elevation. However, the actual LNP footprint will only be a small percentage of the total site. Permanent and affected wetlands will be mitigated through Florida's Regional Off-Site Mitigation Area (ROMA) Plan.

Construction of stormwater drainage ditches may provide an opportunity to create additional wetlands to meet wetland mitigation requirements as per Florida's ROMA Plan. Close coordination with the appropriate resource agencies will be required before a definitive mitigation strategy is developed. Stormwater drainage channels and the riparian zone along the channels could be planted with native vegetation such as cattails, sedges, and hydrophilic grasses. Any wetlands created could provide supplemental habitat for area wildlife.

Additional impacts (to those described above) from construction activities are anticipated to cause temporary effects on wetlands. All construction will be performed in accordance with CWA Section 401 and Section 404 regulations and Florida's regulations concerning CWA Section 401 water quality certifications.

Wetlands at the LNP site may be affected by increased erosion and sedimentation resulting from construction activities. Following the FESC manual

will ensure that impacts on wetlands from erosion and sedimentation will be SMALL.

In some areas, construction will involve excavation up to a depth of approximately 12.04 m (39.5 ft.) (elevation of 3 m [10 ft.] NAVD88) in accordance with the DCD. However, excavation depth may reach 22.86 m (75 ft.) below ground surface for nuclear island foundations. Soil removed from excavations may be used as either fill for wetland areas or backfill. Current groundwater elevations occur around 12.8 m (42 ft.) NAVD88 at the LNP reactor sites. Therefore, temporary dewatering will be necessary. During construction, soil and dredge spoil stockpile areas will be graded and compacted by construction traffic and the areas will be surrounded by silt fencing or vegetated buffer strips. Dredge spoils will be characterized and stockpiled for future use or properly disposed of according to regulatory requirements, if necessary. Spoil areas will have water sprayed on exposed soil to minimize wind erosion during dry periods. Vegetation will be grown on stockpiles to minimize erosion. Surface water impacts caused by temporary disturbance of the ground for soil stockpiles are expected to be SMALL.

4.2.2 WATER USE IMPACTS

The construction-related effects on water use are evaluated based on construction-related effects on water quality and quantity. Impacts are anticipated to last for approximately 54 to 66 months: 18 months for preconstruction activities, and 3 to 4 years for plant construction. Water use impacts from operation are discussed in ER Subsection 5.2.2. Water quality conditions in surface and groundwater are described in ER Subsection 2.3.3. Applicable federal, state, regional, tribal, and local standards and regulations will be followed to minimize water use effects.

During construction, sanitary waste will be managed by an off-site contractor and waste will be taken off-site for disposal.

4.2.2.1 Freshwater Water Bodies

No known communities downstream from the LNP site draw water from the Withlacoochee River for public water supply (ER Subsection 2.3.2.2). No known future water rights or allocations will be affected by LNP water usage. No significant effects on the temperature, quantity of flow, or quality of flow are expected in the Withlacoochee River, Inglis Lock Bypass Channel, or the CFBC from construction-related activities. Construction effects on water quality and quantity are expected to be negligible. Contamination from substrate exposure during excavation is not anticipated. Water use impacts from construction are anticipated to be SMALL.

Usage of the CFBC may be affected during construction of the blowdown pipeline. Impacts may be decreased by using trenchless technology where

possible during construction, but usage of the canal may be temporarily halted during installation.

General construction practices identified in the E&SCP, prepared in accordance with the FESC manual, will restrict the amount of additional sediment in stormwater related to construction activities. Water collected from dewatering operations will be detained in the stormwater ponds to allow particulates to settle.

Discharges related to construction activities will be nonpoint source. All federal, state, regional, tribal, and local regulations relating to nonpoint sources will be observed, as listed in ER Subsection 4.2.1. Impacts on water users and water quality are anticipated to be SMALL.

The potential exists for short-term construction-related changes in suspended solids concentrations that may have minor effects on barge traffic in the canal or usage of the Withlacoochee River and/or Inglis Lock Bypass Channel. No long-term impacts on water use are expected. There may be short-term impacts from restricting access around the intake structure at the CFBC. Recreational users may also be affected by the location of the intake structure. The minor and short-term nature of these effects and the implementation of a specific E&SCP effectively limit potential effects and minimize the exposure of recreational and commercial users to these effects. Therefore, water use impacts from LNP construction are anticipated to be SMALL.

4.2.2.2 Wetlands

Wetlands may be affected if groundwater is pumped from the site. Pumping may cause groundwater levels to decrease, lowering wetland levels. Any affected wetlands will be mitigated under Florida's ROMA Plan. Water use impacts on wetlands from LNP construction will be SMALL.

4.2.2.3 Groundwater Use

As discussed in ER Subsection 4.2.1.4, construction of the LNP is anticipated to cause temporary localized effects on ambient groundwater levels. Therefore, water use impacts from LNP construction are expected to be SMALL.

4.2.3 REFERENCES

4.2-001 U.S. Geological Survey, "Gainesville, Florida 1:250,000 Topographic Map," revised 1978.

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4.3 ECOLOGICAL IMPACTS

This section addresses potential impacts on terrestrial and aquatic ecosystems resulting from the construction of the LNP and associated facilities. Construction impacts on terrestrial ecosystems are discussed in ER Subsection 4.3.1 and impacts on aquatic ecosystems are discussed in ER Subsection 4.3.2.

4.3.1 TERRESTRIAL ECOSYSTEMS

ER Subsection 4.3.1.1 addresses anticipated construction impacts on terrestrial ecosystems on the plant site. Impacts on ecosystems in the areas of the associated facilities are addressed in ER Subsection 4.3.1.2. A Site Redress Plan will accompany this COLA and provides guidance for returning a proposed site to an environmentally stable and aesthetically acceptable condition appropriate with local zoning laws in the event that site activities allowed under a Limited Work Authorization (LWA) are performed. Including the Site Redress Plan with the COLA constitutes assurance that, if activities authorized by the LWA are carried out but are terminated by PEF, the LWA is revoked by the U.S. Nuclear Regulatory Commission (NRC), or the final decision of the NRC is to deny the COLA, the site will not be left in an unacceptable condition or state.

4.3.1.1 Plant Site

Construction of the LNP will result in temporary and permanent impacts on terrestrial ecological communities. Construction will cause direct loss of planted pine and forested wetland communities, and alteration of some of the remaining communities that are located near the construction areas on the LNP site. Table 4.3-1 depicts the approximate areas of impact by land cover type. The land cover types in the table and described below are based on the FLUCCS (Reference 4.3-001). Figure 2.4-6 depicts the land cover types on the LNP site.

Construction of the LNP will result in permanent loss of 338 ac. of tree plantation, (Code 440); 140 ac. of cypress swamp (Code 621); 145 ac. of open lands (Code 260); and 5 ac. of bottomland swamp (Code 615). Less than 23 ac. of the following land cover types will be affected by construction of the LNP: wetland forested mixed (Code 630), freshwater marsh (Code 641), and upland coniferous forest (Code 410).

Most of the subject property, 2455 ac. will remain undeveloped following construction of the LNP. Approximately 650 ac. or about 21 percent will be cleared out of a total 3105 ac., with the balance of the LNP site remaining undisturbed as vegetated buffer.

Construction will result in alteration of some of the remaining habitat through modification in community structure and composition. Construction will further modify a landscape already highly fragmented by silvicultural rotations of pine plantings and harvesting. Creation of additional open area (transmission corridor and other clearings) will favor wildlife species that prefer ecotonal or “edge” environments (such as white-tailed deer [*Odocoileus virginianus*], bobwhite quail

[*Colinus virginianus*], and eastern cottontail rabbit [*Sylvilagus floridanus*]) (Reference 4.3-002) over species that prefer the forest interior. Fragmentation can also make it easier for invasive exotic plant species, such as cogon grass (*Imperata cylindrical*) and Chinese privet (*Ligustrum sinense*), to colonize and spread (Reference 4.3-003). These deleterious impacts can be partially offset through impact minimization measures as discussed in ER Section 4.6.

Terrestrial ecosystems on-site have been degraded through decades of silviculture operations. Conversion from a diverse natural system to planted pine reduces the habitats available to wildlife (see ER Subsection 2.4.1.1.1.6, Other Open Lands, Rural [Code 260]). Construction will result in permanent loss of previously disturbed areas. Most of the wildlife species affected are common and widespread, and tolerant of some degree of human disturbance (see ER Subsection 2.4.1.1).

Construction-related noise and expected disturbance is expected to cause most mobile wildlife to avoid the LNP site during active construction periods, and either return after construction is complete, or migrate to adjacent natural lands. The site borders conservation lands (Goethe State Forest, Figure 2.4-7) and other undeveloped areas that represent abundant and similar habitats for displaced wildlife. Use of elevated construction equipment, such as cranes, will be restricted only to the area and duration necessary to minimize the potential for avian collisions. Clearing and construction will be conducted in a manner that minimizes sedimentation by complying with federal, state, and county regulations and ordinances. ER Section 4.2 more thoroughly discusses BMPs, including sedimentation control measures. Erosion and sedimentation control devices will be maintained, regularly inspected, and re-assessed following storms. Construction dust will be controlled to minimize short-term effects such as sedimentation to streams and CFBC and degradation of water quality. Measures to control construction fugitive dust include wetting the area, as necessary, and using erosion and sedimentation control measures. Any dredge spoil materials that are created as a result of construction activities in wetlands or other water bodies will be tested according to applicable permit requirements and properly disposed of according to the test results.

Individuals of more sedentary wildlife species (such as small reptiles, amphibians and burrowing species) are likely to be directly destroyed by construction. Construction of the LNP will result in direct mortality for certain wildlife and will reduce the available habitat area, but will not adversely affect local or regional populations of wildlife species. Impacts on terrestrial ecosystems are, therefore, expected to be SMALL.

4.3.1.1.2 Important Species

Important species identified at the LNP site (Table 2.4-5) include the game species white-tail deer (*Odocoileus virginianus*), bobwhite quail (*Colinus virginianus*), and wild turkey *(Meleagris gallopavo)*, as well as certain protected species such as gopher tortoise (*Gopherus polyphemus*) and eastern indigo snake (*Drymarchon corais couperi*) that either have been observed on-site or are

identified as likely to occur on-site based on published records (Reference 4.3-003). These species are discussed further in ER Subsection 2.4.1.1.3. Potential effects on important species resulting from LNP construction are described below.

Local and regional populations of white-tail deer, bobwhite quail, and wild turkey are not expected to be adversely affected by construction of the LNP. About 276 ha (683 ac.) out of the 1257 ha (3105 ac.) or 22 percent of the total property area will be developed for the LNP project, leaving abundant similar habitat of planted pine and cypress and mixed hardwood swamp. Development of the transmission corridor, which will create early successional habitat, could enhance forage opportunities for these species (ER Subsection 4.3.1.2).

Several listed species were either observed on-site during ecological surveys by CH2M HILL biologists, or were identified as having potential to occur on-site based on documented occurrences in the property vicinity (Reference 4.3-003) (Tables 2.4-5, 2.4-6, and 2.4-7). Potential impacts on these species as a result of LNP construction are discussed below.

Although the eastern indigo snake was not observed at the LNP site during ecological surveys, it could forage in wetlands on the property and use gopher tortoise burrows for refuge. Areas known to have gopher tortoise burrows will be largely undisturbed, but the loss of on-site wetlands could represent loss of forage habitat for this species. In addition, increased traffic on-site during the construction period increases the chances of roadway mortality for individual snakes.

As stated above, the gopher tortoise is known to inhabit higher elevations in the northeastern and south-central portions of the LNP site. Most of these areas will remain undisturbed following construction. Gopher tortoises found in construction areas will be relocated to appropriate on-site habitat in accordance with the Florida Fish and Wildlife Conservation Commission (FFWCC) Guidelines (Reference 4.3-004), and as discussed in ER Subsection 6.5.1. Gopher tortoises frequently burrow in disturbed and grassy areas such as transmission corridors, and these areas may be used by gopher tortoises following construction.

Bald eagles (*Haliaeetus leucocephalus*) are occasionally observed in flight over the LNP site. An active bald eagle nest is located just south of the LNP site, west of the proposed heavy haul road (see ER Subsection 2.4.1.1.3.2.3). No active eagle nests have been identified on-site, and while forage habitat will be reduced through construction, the LNP project will not adversely affect regional populations of the bald eagle and will minimize the disturbance of bald eagle nests.

Florida black bears are known to inhabit the adjacent Goethe State Forest (ER Subsection 2.4.1.1.3.2.4), and it is likely that they will occasionally use the LNP site for forage or as a travel corridor. They are expected to avoid the site during construction because of noise and human presence, and they will be prevented from entering the LNP site after perimeter fencing is installed.

Red-cockaded woodpecker (*Picoides borealis*) is not known to occur on the LNP site, and is not expected to occur because of the absence of preferred habitat. Therefore, construction of the LNP is not expected to adversely affect red-cockaded woodpecker populations.

The American Alligator (*Alligator mississippiensis*) is known to inhabit marshes and swamps on-site. This species is locally common and construction will not adversely affect local or regional populations.

Wood storks (*Mycteria americana)* and other wading birds, including great blue heron (*Ardea herodias*), little blue heron (*Ardea caerulescens*) and white ibis (*Eudocimus albus*), are occasionally observed feeding in on-site wetlands. These birds are transient visitors to the LNP, usually during periods of high water, and they are not known to nest on-site. Very little of the open water habitat favored by these species currently exists on-site, and it is possible that construction of the stormwater ponds will attract more of these birds to the area.

The Florida Natural Areas Inventory (FNAI) Occurrence Report (Reference 4.3-003) identifies several rare plant species documented as occurring near, but not within the LNP site. No federally listed plant species is known to occur on the LNP site. Cinnamon fern (*Osmunda cinnamomea*) and royal fern (*Osmunda regalis*) were identified in cypress swamps on-site during field surveys. These species are listed as Florida Species of Special Concern because of the potential for commercial exploitation. Some of these plants are expected to be destroyed by construction; however, the species are common in the region and the loss is expected to have an insignificant impact on regional populations.

Consultation with federal and state agencies including the USFWS, National Marine Fisheries Service, and the FFWCC concerning the potential presence of protected species is currently being conducted as part of federal and state permitting processes. Monitoring programs associated with protected terrestrial species are described in ER Section 6.5.

Construction of the LNP is not expected to adversely affect the regional population of any protected plant or animal species. Native habitats on the LNP property have been significantly altered through silviculture operations, and mobile listed species are likely to preferentially use less disturbed habitats on adjacent conservation lands. Impacts on important species are expected to be SMALL.

4.3.1.1.3 Important Terrestrial Habitats

Important terrestrial habitats are defined by the NRC in NUREG-1555 as: 1) wildlife sanctuaries, refuges, and preserves, 2) habitats identified by state or federal agencies as unique, rare, or a protection priority, 3) wetlands and floodplains, and 4) land areas identified as critical habitat for species listed as threatened or endangered. These habitats and their presence within and in the vicinity of the LNP are described in ER Subsection 2.4.1.1.5.

Several conservation areas are in the vicinity of the LNP, and are not expected to be affected by the LNP construction. There are no areas on-site designated by the USFWS as critical habitat for listed species (Reference 4.3-005).

Wetlands comprise the major important terrestrial habitats on-site. Impacts on wetlands were avoided and minimized to the extent practicable during facility siting and site investigative activities. No dredge spoils will be redeposited in wetlands as a result of construction activities. Habitat areas affected by construction of the LNP, including wetland areas, are depicted on Figure 2.4-6. Approximately 88 ha (218 ac.) of wetlands on-site will be permanently affected through construction (Table 4.3-1). Of these, approximately 70 ha (172 ac.) of cypress swamp, 10 ha (26 ac.), bottomland swamp, 6 ha (15 ac.) of mixed hardwood swamp, and 2 ha (5 ac.) of freshwater marsh will be permanently affected. Compensation to offset unavoidable impacts on wetlands is required through both the Federal Section 404/10 and the State of Florida ERP processes. Loss of or impairment to functions of these wetlands will be mitigated through the permitting process (ER Subsection 6.5.1), and habitats similar to the areas affected are abundant in the vicinity. Overall impacts on wetlands as a result of the LNP construction are expected to be MODERATE, based on the abundance of similar wetlands in the vicinity and on the anticipated mitigation of wetlands within the watershed as required under ERP guidelines.

4.3.1.2 Associated Facilities

This subsection discusses construction impacts on areas of the associated facilities, which comprise the associated facilities and the transmission corridors. The associated facilities consist of the following:

- Heavy haul road and barge slip access road.
- Railroad.
- Makeup water pumphouse.
- Blowdown pipeline corridor.
- Makeup pipeline corridor.

Land use construction impacts for the associated facilities and the transmission corridors beyond (south of) the CFBC are addressed in detail in ER Section 4.1.

Figure 2.4-8 and Table 4.3-1 depict the approximate areas of impact by land cover type. The land cover types in the table and described below are based on the FLUCCS. (Reference 4.3-001) Construction of the LNP-associated facilities are anticipated to result in impacts on approximately 441.1 ha (1090 ac.) of predominantly pine plantation, upland forest, and freshwater wetlands and swamp. The areas affected by construction of the associated facilities are similar

to the ecosystems on the LNP site as a result of having been disturbed through silviculture and other anthropogenic activities.

4.3.1.2.1 Important Species

Important terrestrial species identified in the areas of the associated facilities are the same as those identified on the LNP site (ER Subsection 2.4.1.1.3). Important species located in the vicinity of the transmission corridors are identified in ER Subsection 2.4.1.2. Potential impacts on these species resulting from construction of the LNP-associated facilities are anticipated to be similar to those described above for the plant site, with mobile species avoiding the construction areas and returning following construction. Mortality of less mobile wildlife species, such as small mammals, reptiles and amphibians, and burrowing species is expected; however, no significant adverse impacts on the regional population of any species are expected.

An active bald eagle nest is located just south of the LNP site, west of the proposed heavy haul road (ER Subsection 2.4.1.1.3.2.3). LNP construction activities are anticipated to occur only beyond 200 m (660 ft.) from the nest, the guidance distance identified by the USFWS within which monitoring is required. Activities in the vicinity of the nest will be conducted in accordance with current USFWS guidance to minimize any effects on the eagle nest and its occupants (Reference 4.3-006).

4.3.1.2.2 Important Habitats

Important terrestrial habitats in the areas of the associated facilities include the CFG State Recreation and Conservation Area, and wetland systems.

The heavy haul road will go north from CR-40 to the LNP site. The barge slip access road travels south from CR-40 to the anticipated barge slip across CFG land (Figure 2.1-2). This area is a maintained public recreation area, and construction of the LNP-associated facilities will not adversely affect important natural systems in this area. The blowdown pipeline will be buried in the berm of the CFBC from its entry point near the proposed CWIS to a point west of the Route 19 bridge where the pipeline corridor intersects an existing transmission line corridor. The buried pipeline trench will simply be covered by the removed soils, and any excess soils will be removed from the top of the berm and properly disposed of or re-utilized elsewhere on the site. The construction area for the pipeline is mostly unvegetated or scrub vegetation and is not considered important habitat for terrestrial wildlife.

Table 4.3-2 lists the vegetative cover types that will be affected by construction of the LNP early infrastructure facilities. Approximately 53 ha (130 ac.) of wetlands will be affected by the LNP project, including 21 ha (52 ac.) of freshwater marsh, and 19 ha (47 ac.) of cypress swamp. Like the wetlands on the LNP site, wetlands that will be affected by construction of the associated facilities have been degraded, largely through silvicultural activities (ER Subsection 2.4.1.1.1.6

Other Open Land, Rural [Code 260]). Construction will result in permanent loss of previously disturbed areas.

4.3.2 AQUATIC ECOSYSTEMS

The impacts of construction of the LNP on aquatic ecosystems are limited primarily to the following areas of potential concern. Note that an anticipated barge slip unloading facility has been determined to be a separate project subject to a separate project application and permitting action:

- On-site ponds.
- CWIS.
- Cooling system blowdown discharge pipeline and makeup water pipeline corridor.
- Transmission line water crossing points.
- Anticipated barge slip unloading facility.

Figure 4.3-1 shows the location of the CWIS and the proposed route for the blowdown discharge line, including the crossing point at the CFBC. Potential impacts on wetlands from construction are addressed in ER Subsection 4.3.1.

4.3.2.1 On-Site Pools

As noted in ER Subsection 4.3.1, the prolonged use of the majority of the site for silvicultural operations has altered aquatic habitats extensively. Only a few permanent and seasonal pools exist on-site with sufficient depth and form to support aquatic pond life. Species present are limited to a few fish species and invertebrates. No flowing permanent streams are present on the site. The small pools are widely scattered about the site, and none are located in the main reactor construction areas.

Several of the shallow pools were visually examined, and no visible evidence of the presence of fish was noted; however, these observations were conducted during drought conditions. It is likely that during extended wet periods, the isolated pools support a low diversity aquatic species assemblage, including mosquito fish (*Gambisia affinis*), least killifish (*Heterandria formosa*), sailfin molly (*Poecilia latipinna*), and golden topminnow (*Fundulus chrysotus*), along with crayfish and aquatic insects such as damselflies, dragonflies, and midges. No important or protected species are expected to be present in these on-site shallow pools. The two protected fish species potentially present in the general area of the LNP, the smalltooth sawfish and the Gulf sturgeon, utilize open estuarine waters or tidal river habitats. Neither species will be found in small isolated freshwater pools.

A few of these pools will be permanently filled to allow for the construction of required facility infrastructure. Increased siltation from construction runoff could affect additional pools, particularly along newly construction roads and laydown areas. Numerous similar unaffected pools will remain on the site, and those pools on the LNP site that will be filled or disturbed do not contain unique or protected aquatic species. Over time, due to the cessation of commercial silvicultural operations, many of these unaffected remaining pools will develop a more permanent assemblage of aquatic life. Erosion and runoff control mitigation measures will be used to minimize runoff effects; it is anticipated that in approximately 18 months (ER Chapter 1), after preconstruction activities have ceased, the aquatic life in those ponds subject to runoff effects will quickly return to normal conditions.

On-site areas capable of retaining open water, and not affected by site construction and infrastructure, will develop an aquatic fauna now that silvicultural operations have ceased. In addition, stormwater management basins and ponds are expected to develop an assemblage of aquatic fish and invertebrates, either through incidental water bird transfers or through purposeful stocking by individuals or PEF. Because of the creation of stormwater management basins in developed facility areas and the gradual return to natural conditions in areas no longer adversely affected by silvicultural operations, the development of the LNP will, over time, result in much improved aquatic pond habitats and increased pond organism populations; however, it is not anticipated that any important aquatic species will inhabit these pools. Therefore, the adverse impacts of construction on existing aquatic pool habitats are anticipated to be SMALL.

4.3.2.2 Cooling Water Intake Structure

The CWIS will be located approximately 11.1 km (6.9 mi.) from the Gulf of Mexico on the berm that forms the north side of the CFBC (Figure 4.3-1). The CWIS will be located approximately 0.8 km (0.5 mi.) downstream of the Inglis Lock. The CWIS consists of the intake structure, vertical bar screens, traveling screens, pumps, and pumphouse. The length of the water facing side of the CWIS is approximately 34 m (111 ft.). While much of the supporting structure will be located on the side of the berm, the intake structure itself will extend a short distance into the waters of the CFBC and will likely involve the dredging of sediments to allow for the construction of the concrete structure on the bottom.

The anticipated potential construction impacts include sediment release during dredging operations and redeposition to the bottom of the barge canal adjacent to the construction zone. The use of a cofferdam to facilitate construction of the in-water portions of the CWIS will minimize releases of sediment to the CFBC. As noted in ER Subsection 2.4.2.2.1.3, total organic carbon (TOC) was highest near the Inglis Lock (64,667 milligrams per kilogram [mg/kg]) with a decreasing trend downstream toward the canal mouth (9800 mg/kg, 0.8 km [0.5 mi.] west of the canal mouth). This high TOC value indicates that the sediments in the area of the proposed CWIS are trapped below the lock and highly enriched. The CFBC sediment at the proposed CWIS construction area was predominantly silt

(54.0 percent), with the sediment sand component at 29.8 percent and clay at 18.4 percent.

The dredging of these organically enriched sediments during construction of the CWIS will result in the temporary suspension and redeposition of the organic component of the sediment, and the removal of those benthic organisms living in or on the removed sediments. Sediment quality will be characterized according to regulatory process requirements prior to commencement of sediment disturbance. Because of the lack of unidirectional currents in the vicinity of the CWIS construction area, the sand and clay component of the suspended sediments will quickly redeposit in the immediate area. For a short period of time, the organic silts in the suspended sediments will create increased turbidity in the immediate area of the construction. These silts will settle more slowly and over a somewhat wider area than the heavier sand and clay components. However, as noted in ER Subsection 2.4.2, the redeposited sediments are very similar to those existing elsewhere in the CFBC, so any resulting changes in sediment composition will be minimal. No construction effluents are anticipated from the CWIS construction area, other than rainfall runoff to the adjacent CFBC. Clearing and construction will be conducted in a manner that minimizes sedimentation by complying with federal, state, and county regulations and ordinances. ER Section 4.2 more thoroughly discusses BMPs, including sedimentation control measures. Erosion and sedimentation control devices will be maintained, regularly inspected, and re-assessed following storms. The impacts of construction activities at the CWIS on important commercial or recreational species are anticipated to be minor because the area of impacts is limited to the immediate vicinity of the construction cofferdam and is known to occur over only a small portion of the width and cross sectional area of the CFBC, and the in-water construction time periods are temporary and limited to a few months duration.

Fish and motile crustaceans present in the area during construction of the CWIS will either avoid the area during active construction or actively feed on suspended organisms during dredging operations, and are unlikely to be adversely affected by the construction activities. As shown in Table 2.4-16, the benthic infauna (those organisms living directly on or in the surficial sediments) are depauperate in the area of the proposed CWIS construction, averaging only 113 organisms per square meter and composed of only three taxa: Polychaeta (segmented marine/estuarine worms), Decapoda (crabs), and Gastropoda (snails). No important aquatic species are known to reside in the upper only federally protected aquatic species portions of the CFBC in the vicinity of the CWIS construction area. Manatees, a federally protected aquatic species, have not routinely been observed in the upper portions of the CFBC but could potentially visit the area near the CWIS construction site. Plans for protection of the manatee during LNP construction activities near the CWIS include professional biologists in boats observing the construction area. Should manatees approach the area during active construction periods, the biologists will immediately contact the site construction manager, who will have the authority to suspend construction until manatees have left the area. The biologists will then consult with regulatory agencies about the action taken for manatee protection and

determine when a construction restart is feasible. The temporary short-term impacts of construction of the CWIS are not anticipated to have adverse impacts on the two protected fish species, the smalltooth sawfish and the Gulf sturgeon, should either species be present in the construction area, which is an unlikely occurrence. Neither species has a preferred habitat similar to the current biologically impaired and reservoir-like flow conditions in upper portions of the CFBC.

Because of the currently poor condition of the sediments and benthic infauna in the vicinity of the proposed CWIS construction, and the similar nature of the sediments in nearby areas anticipated to experience redeposition, the adverse impacts of construction of the CWIS are anticipated to be SMALL.

4.3.2.3 Cooling System Blowdown Discharge Pipeline

As noted in ER Chapter 3, cooling tower blowdown from a series of mechanical draft cooling towers, including dissipated waste heat, will be transported in two pipelines (one for each unit) from the LNP. These pipelines will run south to the CFBC, alongside the makeup water pipeline, and along the northern berm of the canal (Figure 2.3-13). The cooling water discharge pipeline will then cross the canal just north of Crystal River and follow an existing transmission line corridor into the CREC and to the existing CREC discharge canal. The method of crossing the CFBC will involve the construction of a trench in the bottom of the canal. The trench will be filled to approximate preconstruction contours once the pipeline is emplaced, and no long-term changes to the channel configuration or navigation use of the CFBC will occur. No water-based structures involving the construction of piers, jetties, dikes, berms, or similar structures will occur as part of the placement of the blowdown pipelines. No in-water structures are anticipated for the blowdown pipeline crossing over the Inglis Lock Bypass Channel. A structural bulkhead and anchor piers may be constructed on the CFBC berms where the pipelines enter and exit the water.

The selected construction method will disturb sediments at the cross section of the canal bottom chosen for crossing, resulting in temporary changes in the sediments, temporary removal of benthic infauna from the width of the pipeline corridor, and the benthic recolonization of the sediments once the pipeline construction has been completed. Because the quality of the benthic infauna near the area of the crossing (ER Section 2.4, Table 2.4-16, Station 3) is low compared to that near the mouth of the canal (Station 4) and in near-shore Gulf waters (Stations 5 through 7), and the fauna is anticipated to return to the prior condition within a relatively short timeframe following the completion of construction, the impacts are anticipated to be minimal and temporary. Because of the short-term nature of the construction activities, the relatively short-term recovery periods for disturbed benthic species within and near the dredged trench, and the fact that the area of bottom sediment likely to be affected by the dredging activities is a very small percentage of similar habitats in the CFBC and similar nearby Gulf sediments, no long-term effects on important species habitats within the CFBC are anticipated to occur. In addition, the percent of the cross section of the barge canal involved in dredging and pipeline emplacement

activities at any point in time is unknown at this time because a detailed construction plan for this project element has not been developed. The water quality in the immediate area of the dredging and trenching activities will experience temporary increases in turbidity, suspended sediments, and reductions in water clarity. Dissolved oxygen levels and salinity levels should not be affected. Detailed chemical characterizations of the sediments in those areas proposed to be dredged will be sampled according to the requirements of dredging permits prior to commencement of dredging and any special sediment handling requirements suggested by the sediment sampling results and required by the dredging permit will be followed.

To limit the disturbances from construction, coordination with regulatory agencies will take place to reduce effects on the ecology of the area, applicable permits will be acquired, and BMPs will be used to manage and protect rare plants along pipeline ROWs. The construction of the blowdown discharge outfall in the existing CREC discharge canal will not affect the ecology of the canal because the discharge canal is an artificial structure with a limited benthic aquatic community, the proposed construction activities affect a relatively small portion of the CFBC and any impacts are anticipated to be localized and temporary, and no other construction-related effects are anticipated to occur. The same manatee protection plan discussed in ER Subsection 4.3.2.2 will be applied to construction activities for the pipeline. Potential adverse impacts on protected fish species, the smalltooth sawfish and the Gulf sturgeon, are not anticipated to occur because it is unlikely that either species will be present in the area of the proposed construction and the nature of the temporary construction impacts would have no adverse impacts. Individual fish would simply avoid the area of active construction or opportunistically feed on disturbed and available benthic prey species. The impacts of construction of a blowdown pipeline crossing are anticipated to be SMALL.

4.3.2.4 Transmission Line Water Crossing Points

The transmission lines leaving the site and connecting to the nearest high-voltage substations cross the following named water bodies: Withlacoochee River, CFBC, and Inglis Lock Bypass Channel. Due to the relatively small size of the water bodies to be crossed at the proposed locations of the crossing points, it will not be necessary to place tower structures directly in the water bodies. The proposed locations are shown on Figure 2.2-8. The potential effects of transmission line construction activities are discussed in ER Subsection 4.1.2.1. Protected fish species, should they be present in a crossed water body, will not be adversely affected due to the lack of the placement of tower structures directly in the water body and the planned BMPs for land-based construction activities.

4.3.2.5 Anticipated Barge Slip Unloading Facility

The proposed barge slip has been determined to be a separate project, and a distinct project application and permitting action applies. However, because the anticipated barge slip will also directly serve the construction activities of the LNP, the potential aquatic impacts are also addressed here. The planned

construction activities and potential impacts are essentially the same as those discussed in ER Subsection 4.3.2.2 for the CWIS because the proposed barge slip will be located only a short distance down canal from the CWIS. The manatee protection plan for the construction of the barge slip will be the same as that described in ER Subsection 4.3.2.2 for the CWIS. Barge slip construction activities will not have adverse impacts on protected fish species because neither the smalltooth sawfish nor the Gulf sturgeon are anticipated to be present in the upper portions of the CFBC.

4.3.3 REFERENCES

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4.3-005 U.S. Fish and Wildlife Service, “FWS Critical Habitat for Threatened & Endangered Species,” Website, criticalhabitat.fws.gov/, accessed March 20, 2008.

4.3-006 U.S. Fish and Wildlife Service, “National Bald Eagle Monitoring Guidelines,” September 2007.

Table 4.3-1
Potential Land Cover Class Impacts on the LNP Site

FLUCCS Code	Classification	Area On-Site (ac.)	Percentage of Total Site Area
260	Other Open Lands (Rural)	144.8	4.7
410	Upland Coniferous Forest	0.2	0.006
440	Tree Plantations	337.6	10.9
615	Stream and Lake Swamps (Bottomland)	4.9	0.2
621	Cypress	140.4	4.5
630	Wetland Forested Mixed	15.1	0.5
641	Freshwater Marshes	7.5	0.2

Notes:

ac. = acre

Source: Reference 4.3-001

Table 4.3-2
Potential Land Cover Class Impacts for LNP-Associated Facilities

FLUCCS Code	Classification	Area (ac.)
110	Residential, Low Density	10.6
160	Extractive	4.5
190	Open Land	39.6
210	Cropland and Pasture	16.9
260	Other Open Lands (Rural)	46.9
320	Shrub and Brushland	6.9
330	Mixed Rangeland	20.0
410	Upland Coniferous Forest	101.8
430	Upland Hardwood Forest	54.7
440	Tree Plantations	359.4
510	Streams and Waterways	2.3
520	Lakes	0.1
530	Reservoirs	3.2
610	Wetland Hardwood Forests	3.2
620	Wetland Coniferous Forest	47.2
630	Wetland Forested Mixed	27.2
640	Vegetated Nonforested Wetland	52.3
740	Disturbed Land	2.0
810	Transportation	5.4
830	Utilities	14.5
	TOTAL	818.8

Notes:

These data do not include transmission corridors.

ac. = acre

Source: Reference 4.3-001

4.4 SOCIOECONOMIC IMPACTS

This section follows the content and organization of NUREG-1555, which is designed to meet the requirements of 10 Code of Federal Regulations (CFR) 51. This section was prepared in accordance with NUREG-1555 and is organized into the following subsections:

- ER Subsection 4.4.1 — Physical Impacts
- ER Subsection 4.4.2 — Social and Economic Impacts
- ER Subsection 4.4.3 — Environmental Justice Impacts

This section evaluates the socioeconomic impacts related to construction of the LNP site and appurtenant facilities as described in ER Section 2.5. The following assumptions, which are discussed further in ER Subsection 4.4.2, are used to bracket the socioeconomic impacts associated with construction:

- Site preparation will take approximately 18 months.
- Construction will take approximately 42 months with the construction schedule staggered 1 year between units.
- Construction completion is projected in 2016 for LNP 1 and in 2017 for LNP 2.
- Combined peak workforce for both units is projected by PEF to be 2700 workers during 2014.
- Construction start, finish, and unit startup dates are discussed further in ER Subsection 1.1.7.

Socioeconomic impacts that are limited to a 6-year site preparation and construction period or shorter are referred to as temporary to distinguish them from any impacts that would extend beyond this period.

4.4.1 PHYSICAL IMPACTS

The following construction-related physical impacts have the potential to affect nearby populations. These impacts are defined by regulations that specifically address acceptable levels of change to existing noise, air, and visual quality. The following subsections describe relevant requirements for construction activities that could result in noise, fugitive dust, air emissions, and visual aesthetic disturbances. The majority of the construction-related impacts are anticipated to be short term and temporary. Where impacts are identified that have the potential to be adverse, the LNP Combined License (COL) Applicant is committed to mitigating these physical impacts, where possible, through the use of construction-related BMPs. These BMPs include wetting down roadways and

construction sites, scheduling noisy operations during daytime hours, and suppressing blast and shock effects by using mats.

The nearest residences are 2.6 km (1.6 mi.) to the northwest and 2.8 km (1.7 mi.) to the west-southwest. The nearest municipality is Inglis, which is 6.6 km (4.1 mi.) from the LNP site. As described in the following subsections, adverse physical impacts from construction activities will be short term and will not significantly affect people in the LNP site, vicinity, or region as defined in ER Section 4.1.

4.4.1.1 Noise

Construction noise will occur during LNP site preparation and construction activities that will include clearing, grading, earthmoving, foundation preparation, pile driving, concrete mixing and pouring (including on-site concrete batch plant operation), steel erection, and various stages of plant equipment fabrication, assembly, and installation. A substantial number of diesel- and gasoline-powered vehicles and other equipment may be on the site at any given time during the construction phase of the project; noise consistent with a large construction project and substantial noise will be generated by that equipment. As a result, background noise levels on and near the site will increase but will primarily be limited to daytime hours. The level of perceptible noise at any given location will depend on the intensity of the construction activities; meteorological conditions, including temperature, humidity, and wind speed; the distance from the site; and the amount of noise absorbing vegetation between the source of the noise and the observer.

A noise assessment of the LNP site was performed in support of the LNP's Site Certification Application (SCA) to the State of Florida. An assessment of the impacts on ambient noise levels during the construction of the LNP was previously evaluated in support of PEF's SCA to the State of Florida and described in a report entitled, "Noise Assessment of Proposed Levy Nuclear Plant," dated March 10, 2008. Additional information on the noise assessment is provided in ER Subsection 5.3.4.2. The noise assessment, which was based on an ambient background noise measurement program and a comprehensive noise modeling analysis using the CADNA/A noise model, indicated that noise from construction equipment used for clearing, excavation, and construction activities may be perceptible at the nearest off-site locations during intense construction activities; however, most off-site noise levels (at the locations of the nearest residences and sensitive receptors) are predicted to be below the daytime noise limitation of 65 decibels established by the Levy County Noise Ordinance for residential, rural, and commercial districts during the hours of 7 a.m. to 10 p.m. The noise assessment report also concluded that there could be short periods of time when these levels could be exceeded when intense noise-generating activities (such as pile driving) are occurring. To limit potential noise impacts at off-site locations, BMPs (such as scheduling activities during periods when noise levels will be of the least concern) will be developed and implemented, and periodically reviewed for effectiveness. Short-term periods when elevated noise levels could also be experienced near construction zones

for the pipeline and heavy haul road corridors, and the cooling water pumphouse that will be located near the CFBC. However, noise levels in these areas are expected to persist for a much shorter duration than at the main plant site. BMPs will also be developed, implemented, and periodically revised construction in these areas.

Construction noise could be noticed by a few nearby residents and some individuals participating in recreational activities along the CFG and in Goethe State Forest. The Inglis Island Trail, part of the CFG, is approximately 5.4 km (3.4 mi.) from the LNP site, and the closest point in the Goethe State Forest is 4.5 km (2.8 mi.) from the LNP site (Figure 2.1-1). The nearest residences are located approximately 2.6 km (1.6 mi.) to the northwest and 2.8 km (1.7 mi.) to the west-southwest of the center of the LNP site (Figure 2.3-40). At these distances, construction noise is not expected to be very noticeable except possibly during limited periods of very intense construction noise (such as pile driving), and when ambient background noise is exceptionally low.

In general, noise during construction is not expected to significantly affect off-site areas, including the locations of nearest residences and recreational areas that are in the general proximity of the LNP site. Noise impacts on the surrounding area during construction are, therefore, anticipated to be SMALL.

4.4.1.2 Air Quality

The construction of the LNP site has the potential to have an impact on ambient air quality in the immediate vicinity of the main plant site, and to a lesser extent, in the vicinity of the heavy haul road, transmission corridors, pipeline corridor, and installation of the intake structure and pumphouse near the CFBC. However, because of the very large nature of the site (approximately 1257 ha [3105 ac.]) for the main site, exclusive of pipeline corridors or other linear access routes), and the relatively large distance from the center of the project site (where most construction and equipment laydown will occur) to the site boundaries, impacts on air quality at off-site locations are expected to be infrequent and minimal during site development and plant construction. Construction activities can be expected to generate fugitive particulate matter (PM) emissions, as well as vehicle and construction equipment-related exhaust emissions. Fugitive PM emissions will result primarily from ground clearing, excavation, grading, cut and fill operations, and vehicular travel over paved and unpaved roads. Construction equipment emissions will primarily come from diesel-powered heavy equipment used and traffic caused by construction workers accessing the site. Once cleared, exposed land areas may also generate fugitive dust as a result of wind erosion.

As part of the site development, vegetation and forested areas will be cleared from the necessary portions of the project site that will be developed. The size of the developed area (including material and equipment laydown areas) is expected to be in the range of 20 percent of the overall site area (approximately 242.8 ha [600 ac.]). Cleared material will either be processed for beneficial reuse or burned on-site. Any open burning associated with land clearing will be

conducted in accordance with Florida Regulations, specifically Chapter 62-256 Open Burning, of the F.A.C. Open burning would only be conducted after the appropriate notifications and approvals are obtained from the FDEP, as required by F.S.

Emissions from on-site construction equipment including cranes, trucks, earthmoving equipment, compressors, pile drivers, and other diesel- and gasoline-powered equipment will also occur, primarily as emissions of particulate matter of 10 micrometers and smaller (PM_{10}), sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compound (VOC). These emissions are expected to be consistent with emissions from other large construction projects of this size, and there should be no significant impacts on air quality at off-site locations during the construction period.

Foundations and other structures will require substantial amounts of concrete. The large volume requirements will require the installation and operation of a temporary concrete batch plant on the site during the construction period. While there will be air emissions from the concrete batch plant, they are expected to consist primarily of PM (from cement and aggregate handling and storage) and diesel exhaust emissions from trucks accessing the batch plant during operations. It is expected that batch plant operations will be monitored by the plant operator and its emissions controlled to limit emissions during operation, and there should be no significant or discernible impacts on air quality at off-site locations resulting from its operation. Because materials used in concrete production will be delivered to the site in bulk by truck, barge, or rail, the operation of an on-site concrete batch plant will effectively reduce regional and local emissions from concrete mixing and delivery trucks that would otherwise be entering and leaving the site. If any temporary air operating permits will be required for the operation of the batch plant, they will be obtained by the operator of the plant, and the plant will comply with all applicable requirements imposed by FDEP's regulations.

A variety of control measures will be implemented during the construction period to minimize air emissions and their potential impact on the surrounding environment particularly at off-site locations. These measures will include the following controls and procedures:

- Grading will be performed to promote good drainage. This will minimize the potential accumulation of mud on equipment tires that could be transferred to road surfaces, which could generate fugitive dust from wind erosion, traffic, or heavy equipment operation.

- Ground surfaces will be stabilized as soon as practical to prevent wind erosion.

- Those areas that will revert to maintained grounds will be reseeded as soon as practicable to reduce the potential for fugitive dust generation.

- During dry conditions, bare ground in the construction area and along nearby construction roads will be wetted to minimize the generation of fugitive dust from vehicle traffic.

- Roadways used to access the LNP site will be wetted to minimize fugitive dust from traffic or heavy equipment operation.

- Open or lightly traveled areas will either be paved, covered in hard-packed aggregate, or vegetated to minimize fugitive dust emissions from traffic and wind erosion.

- Heavily traveled unpaved construction roads and laydown areas will be stabilized with suitable materials such as stone dust to prevent wind erosion or fugitive dust generation by heavy equipment.

- Applicable air pollution control regulations with regard to open burning and the operation of fueled vehicles will be followed.

- Where required, permits and operating certificates will be obtained.

- Fuel-burning construction equipment will be maintained in proper mechanical order to minimize emissions.

- All reasonable precautions will be implemented to prevent accidental brush or forest fires.

A fugitive dust control plan will be developed and reviewed periodically to assess and improve the effectiveness of fugitive dust control measures and practices.

During the construction period, PM emissions will be generated that will consist of both PM and PM_{10}. The emissions can be expected to vary considerably during the hours of construction on a daily basis (primarily during daylight hours), as well as throughout the construction period. The primary variables that will affect construction-related emissions are expected to be the type and amount of construction activities, and ambient conditions such as wind speed, wind direction, humidity, and soil moisture content. While the U.S. Environmental Protection Agency (USEPA) and FDEP have promulgated ambient air quality standards for PM_{10}, it is not expected that this standard will be exceeded or even threatened at any off-site locations as a result of construction activities. Presently, the entire State of Florida is designated as being in attainment of the National Ambient Air Quality Standards (NAAQS) for all pollutants. The LNP site is located in Levy County, which is currently designated by the USEPA as being in attainment of the NAAQS. The compliance status of the area is not expected to change as a result of the construction of the LNP.

Air quality impacts on the surrounding area attributable to the construction of the LNP site are anticipated to be SMALL.

4.4.1.3 Visual Aesthetic Disturbances

The LNP uses vegetation and distance as a visual screen or buffer from surrounding land uses. Construction activities at the plant site should not be visible to nearby residences. However, the construction activities of the LNP site and its associated components, including the pumphouse, transmission corridor, blowdown pipeline corridor, railroad, heavy haul road, and barge slip access road may be visible to those recreating in Goethe State Forest and to boaters or other individuals conducting water-based recreational activities on the CFG. Because the main portion of Lake Rousseau is east of the LNP, those pursuing water-based activities will have minimal visual exposure to construction activities. See Figure 2.1-1 for the locations of these recreational areas in relation to the LNP site. A detailed description of transmission line corridors and the blowdown pipeline corridor is further discussed in ER Subsection 4.1.2.

Tree clearing and construction activities will be visible along roads, along the transmission corridors, along the pipeline corridor, and at the construction site for the intake structure and pumphouse. The Inglis Island Trail, located approximately 5.4 km (3.4 mi.) from the LNP site, and Inglis Lock Recreation Area will experience the most tree clearing and construction impacts south of the LNP site because of the transmission line and blowdown pipeline corridor construction as shown on Figure 2.1-2. Recreational users of the Goethe State Forest, located 4.5 km (2.8 mi.) north of the LNP site, might also experience visual aesthetic disturbances from construction (Figure 2.1-1).

The area around the site is buffered with trees and shrubs that help mitigate the visibility of construction activities. The edge of the Goethe State Forest is near the northern border of the LNP site property. Currently, the LNP site is buffered from the state forest with trees and scrubs, but the existing vegetation will be cleared during construction. However, the clearing and construction will only affect the areas of the Goethe State Forest closest to the site. Overall, the Goethe State Forest encompasses a land area of 21,609 ha (53,398 ac.), and the majority of the forest will experience little to no construction impacts.

The area to the south of LNP site is also buffered with vegetation, but the presence of the manmade CFBC and the cleared lands along the shoreline contribute to the area's nonpristine conditions. However, the CFBC is popular fishing area to recreational users. During the construction phase, recreational users on the CFG and along the CFBC near the transmission corridor, heavy haul road, pipeline corridor, or pumphouse construction site will not be screened from the timber harvesting activities. To avoid visual and noise impacts from these construction activities, users can relocate to other areas of the CFG. This potential displacement would be a SMALL impact because other areas of the park are available and are relatively not affected.

BMPs to mitigate visual aesthetics during construction activities will be used and include the following:

- Restricting construction laydown areas to minimize disturbance and visual intrusion.
- Removing construction debris in a timely manner.
- Burning of logging debris, in accordance with local regulations, will be done to minimize air quality and visual impacts.

The construction and tree clearing impacts are anticipated to be temporary and mitigated. Long-term visual impacts will result from the construction of the transmission line corridors, blowdown pipeline corridors, the LNP site, and pumphouse feature. The cleared ROWs in the corridors and the land cleared for the LNP site will alter the vegetation from trees and scrubs to maintained grassy areas. The LNP site and pumphouse area will also have an industrial appearance. However, the pumphouse will be located on the existing CFBC, which is already a nonpristine, manmade feature. Overall, these long-term effects will have a SMALL impact on the visual aesthetics.

4.4.2 SOCIAL AND ECONOMIC IMPACTS

The following subsections discuss social and economic impacts in the vicinity and region. Impacts from both construction activities and the construction labor force are addressed.

- ER Subsection 4.4.2.1 — Economic Characteristics
- ER Subsection 4.4.2.2 — Tax Impacts
- ER Subsection 4.4.2.3 — Social Structure
- ER Subsection 4.4.2.4 — Housing
- ER Subsection 4.4.2.5 — Educational System
- ER Subsection 4.4.2.6 — Recreation
- ER Subsection 4.4.2.7 — Public Facilities and Services
- ER Subsection 4.4.2.8 — Security Services
- ER Subsection 4.4.2.9 — Water and Wastewater Services
- ER Subsection 4.4.2.10 — Transportation Facilities
- ER Subsection 4.4.2.11 — Distinctive Communities

Social and economic impacts associated with constructing the LNP include impacts on the economy, tax and social structure, housing, educational,

recreational, and public services and facilities, transportation facilities, and distinctive communities. Most of these subsection headings are self-explanatory. However, some types of impacts have been grouped together. ER Subsection 4.4.2 addresses the anticipated population settlement pattern. ER Subsection 4.4.2.1 includes a discussion of utilization of private sector regional materials, products, and services, as well as regional labor. ER Subsection 4.4.2.3 also addresses impacts on local planning-political decision processes, and ecological and land use impacts, including human displacement.

PEF anticipates that the combined construction workforce for both units will reach its peak of 2700 workers during 2014. It is estimated that the peak workforce by year during construction will be:

- 2010: 300 workers
- 2011: 500 workers
- 2012: 1600 workers
- 2013: 2600 workers
- 2014: 2700 workers
- 2015: 2200 workers
- 2016: 800 workers
- 2017: 200 workers

There would be a gradual ramp up in the construction workforce beginning with 200 workers during the first three quarters of the site preparation phase. This would increase to 400 workers by the end of the 18-month site preparation phase. The first quarter of the construction phase would require about 500 workers. This figure would increase for about 30 months until it reached the peak workforce of 2700 workers for two units during the first two quarters of 2014. Thereafter, the number of workers would decline for the duration of the construction and testing periods as described in ER Subsection 1.1.7. It is anticipated that there would be a 1-year overlap between the construction workforce for LNP 2 and the operations workforce of LNP 1. A combined workforce of 700 workers is estimated for 2017 based on the 200 remaining construction workers at LNP 2 noted above and an initial operations work force of 500 for LNP 1. PEF estimates a total escalated construction cost of $16.6 billion, which includes the cost of constructing LNP 1, $5.6 billion, LNP 2, $3.7 billion, and the transmission corridors, $2.5 billion, as well as the cost of financing.

This evaluation assesses impacts of construction and of demands placed by the construction workforce on the 80-km (50-mi.) region. This assessment is limited to the construction period. In addition, to the extent of available data, and when

needed for the purpose of employing conservative assumptions, impacts at smaller regions that make up one or more counties within the 80-km (50-mi.) region were evaluated. Conservative assumptions were based on avoiding overestimating positive impacts and underestimating negative impacts.

The major factor determining social and economic impacts is the number of construction workers who choose to relocate to the region. Typical construction workers anticipated to be needed for LNP construction include welders, fabricators, carpenters, millwrights, electricians, ironworkers, laborers, and pipefitters. As discussed in ER Subsection 2.5.2, the size of the total construction workforce in the region is over 39,000 workers. While unemployment rates have historically been low, the current slowdown in the construction industry, as well as efforts on the part of Workforce Florida and PEF to grow the local construction workforce within the region, supports the assumption that 50 percent of the 2700-person construction workforce will come from the existing construction workforce while the balance will migrate from outside the region. (References 4.4-001, 4.4-002, and 4.4-003) To assess the higher potential impacts of 100 percent in-migration of the construction work force multiply the results in the following discussion by two.

Another factor affecting the economic impacts is the share of the construction expenditures spent on the purchase of goods and services that are produced within the region. Because of the temporary nature of the construction jobs, it is assumed that the construction workers will tend to settle in the areas that are most accessible to a wide range in job opportunities; that are within commuting distance of the LNP site; and that have available housing, including rental properties and suitable places for motor homes. This set of assumptions has led to allocating workers to counties in the following proportions: Levy (5 percent), Citrus (17 percent), Marion (35 percent), Alachua (35 percent), Dixie (2 percent), Gilchrist (2 percent), Hernando (2 percent), and Sumter (2 percent) as presented in Table 4.4-1. These percentages are closely tied to the share of the available housing in the region, with slight adjustments for convenience of road access to the site. During peak construction, it is estimated that 1350 workers will migrate to the region (50 percent of 2700 construction workforce) and will be distributed across the region as shown in Table 4.4-1.

It is recognized that the specialized component of the construction workforce may be in relatively scarce supply both within and outside the region as the nuclear industry continues to grow. PEF and other industry representatives have initiated partnerships and created programs with schools to develop educational programs and attract students to help fill these gaps (Reference 4.4-003).

The average household size for the State of Florida (2.49) was applied to the peak assumption for incoming construction workers (1350) as a conservative assumption that some would bring their families due to the length of the construction period (Reference 4.4-004). This resulted in an estimate of 3362 people migrating to the region. Based on these estimates of changes in the workforce and demographics, likely bounds can be placed on the extent of positive and negative social and economic impacts from construction.

The economic impacts fall into the positive category because increases in jobs, earnings, and output are generally viewed as beneficial to the economic well-being of the community. The employment impacts are estimated at the regional level, but assumed to be spread over the entire 80-km (50-mi.) region based on the estimated settlement pattern as presented in Table 4.4-1. The increased spending on capital and private sector goods and materials produced within the region will positively contribute to output. However, goods and services that are imported from outside the region do not count toward the region's output. The economic analysis is based on the assumption that 50 percent of the non-labor purchases related to the construction of the AP1000 will come from outside the region due to their highly specialized character; however, PEF is committed to purchasing as much locally as is feasible.

To the extent that population shifts occur as a result of constructing the LNP site, this can cause a strain on the existing housing, roads, schools, infrastructure, and public services. An attempt was conducted to examine the potential negative impacts by using the above reasonable assumptions for allocating project-induced population shifts to each of the counties. Based on the small size of the construction workforce in relation to the population of the region, any impacts on these resources would not be apparent at the regional scale. However, closer examination of potential impacts from construction in Levy County is warranted because most of the construction activity will take place there.

4.4.2.1 Economic Characteristics

The economic impacts from construction of the LNP site depend on the new jobs that are brought to the region as well as on the purchases of private sector materials, products, and services that are produced within the region.

4.4.2.1.1 Employment

As stated in ER Subsection 4.4.2, the estimate of the peak workforce for the LNP site is 2700 construction workers and 50 percent of these workers would be new to the region. This would generate an additional 1350 direct jobs in the construction sector within the eight counties of the 80-km (50-mi.) region. Because this influx of new workers would spend part of their income on housing, food, entertainment, and other goods and services in the region, additional indirect jobs would be created through the multiplier effect. The value of the 2005 Regional Input-Output Modeling System (RIMS) II jobs multiplier for the construction sector in this eight-county region is 1.7. The derivation of the RIMS II multiplier is described Bureau of Economic Analysis (BEA) (Reference 4.4-005). Based on the 1.7 job multiplier, 2295 (1350 multiplied by 1.7) new jobs would be created for the region. It is assumed that the 945 indirect, or induced, jobs (2295 minus 1350), would be filled by workers who would be unemployed absent the project. These indirect jobs would be filled by people already residing in the 80-km (50-mi.) region.

4.4.2.1.2 Earnings

The average annual income for workers in heavy construction in Florida is approximately $45,919 in 2007 dollars. This estimate is for power and communications system construction contractors and was based on 2006 information developed by the Employ Florida Banner Center for Energy and Florida Agency for Workforce Innovation Labor Market Statistics Center using the price index to convert the 2006 dollars to 2007 dollars (References 4.4-003, 4.4-006, and 4.4-007). Preliminary studies by PEF indicate that additional costs should be considered when planning for total construction labor requirements and the ability to attract skilled labor. Per diems must be factored into craft compensation to compete for labor resources and performance-based or position-specific based (certifications) incentive programs are often included in the compensation package to attract and maintain a skilled labor force. An estimate of $62 million (45,919 multiplied by 1350) in peak earnings will be generated from construction. Along with direct earnings, there would be additional indirect earnings over the construction period through the multiplier effect. The RIMS II earnings multiplier for the construction sector is 1.57 (Reference 4.4-005). Therefore, the total earnings would increase by $97.3 million ($62 million multiplied by 1.57) during the peak construction year. The earnings would be lower in the nonpeak years. Total earnings in the eight counties of the 80-km (50-mi.) region were over $14 billion in 2005 (Reference 4.4-001). Overall, the peak year of construction would contribute less than 1 percent in earnings to the region.

The distribution of the new workers within the region is the primary driver for earnings impacts distribution among the eight counties. The earnings are estimated to be distributed as follows: Levy (5 percent), Citrus (17 percent), Marion (35 percent), Alachua (35 percent), Dixie (2 percent), Gilchrist (2 percent), Hernando (2 percent) and Sumter (2 percent). This increase in earnings is a temporary positive impact. After the construction period, the 1350 new construction workers are assumed to gradually migrate back out of the region or to find other jobs within the region. To the extent that the workers tend to leave the region, this will offset some of the small positive impact on jobs and earnings that was created during their tenure in the region.

4.4.2.1.3 Output

In addition to jobs and earnings, the construction of the LNP would contribute positively to the regional economy through purchases of private sector materials, products, and services that are produced in the region. As stated in ER Subsection 4.4.2, the total cost of constructing two units at the LNP site, including labor, is estimated at $9.3 billion. Most of the capital and materials are specialized. To the extent that they are produced outside the region, these construction expenditures would not have a positive impact on the regional economy. However, PEF, when possible, will purchase local goods and services. It is assumed that 10 percent of the total construction costs, or $930 million over the 6-year construction period, will be for local expenditures. Based on this assumption, direct local construction expenditures would average $155 million

per year ($930 million divided by 6 years) over the 6-year construction period. These direct expenditures would tend to be distributed over the eight counties in the region in rough proportion to the sizes of their existing economies. In addition to the direct expenditures, the local economy would benefit from increased indirect expenditures as a result of the multiplier effect. The RIMS II output multiplier for the eight-county region is 1.7 (Reference 4.4-005). Therefore, on average for each of the 6 years of construction, the total increase in local output would be $263 million ($155 million multiplied by 1.7).

Based on this information, a temporary, small beneficial economic impact is expected because of the increased employment of regional construction workforce and earnings, and the purchase of local goods and services.

4.4.2.2 Tax Impacts

Increased tax payments from constructing the LNP site are viewed as a benefit to the state and the local jurisdictions in the region. Construction-related activities would generate sales tax revenue from direct and indirect construction purchases, and from the purchases of households receiving wages from the direct and indirect construction jobs. Corporate income taxes are a second source of revenue for the state, while property taxes are primarily paid to Levy County. The State of Florida does not have a personal income tax. (Reference 4.4-008)

4.4.2.2.1 Sales Tax

As stated in ER Subsection 4.4.2, PEF estimates a peak construction labor force of 2700, and 50 percent are assumed to migrate to region with their families. During the construction period, these 1350 new workers and their families would spend part of their income in the region on taxable items from restaurants, hotels, and retail shops, contributing to tax revenue. Their expenditures would also result in higher personal income for current residents in the region as described in ER Subsection 4.4.2.1.2. As these residents experience an increase in earnings, they also would spend some of the increase in their disposable income on taxable goods in the region.

Increased sales and use tax could result from the purchase of taxable materials and services to construct the LNP site. Most of these purchases of equipment and materials will qualify for Florida's steam production and pollution control sales tax exemption. Only nonexempt purchases would be taxed. The total tax rate on taxable purchases would be 7 percent, including the 6 percent state tax, plus a 1 percent sales tax surcharge collected by Levy County.

Taxable goods and services in the state are subject to a 6 percent sales tax. The sales tax revenue is remitted to the state, which collected over $27 billion in sales tax revenue in 2006 (Reference 4.4-009). Sales and use tax collections from constructing the project will contribute less than 1 percent to Florida sales tax revenue. Some of this revenue will be returned to the counties to help fund local services.

One additional source of sales tax revenue that would accrue to local jurisdictions is the local tourism tax. To the extent that construction workers use local hotels, they would be subject to this tax, which in Levy County is 2 percent. These tax collections would be disbursed among the eight counties in the region according to the location decisions of the migrant construction workers and the shares who choose hotels instead of one of their other living arrangements as discussed in ER Subsection 4.4.2.4.

4.4.2.2.2 Property Tax Revenue

As discussed in ER Subsection 2.5.2.1.2, property taxes are assessed and collected by the taxing jurisdictions within the county, including special districts and independent school districts. The combined millage rate for Levy County is 15.579. This means that PEF would pay $15.58 dollars in property taxes for every $1000 dollars in assessed value of the property. These payments, however, do not commence until the plant begins operation, which could cause Levy County to experience minor, temporary impacts to local government services until a stable funding source is available for infrastructure upgrades. Subsequent to construction, the additional tax valuation by Levy County would be based on the cost of construction, less the cost of the pollution control components. PEF estimates that approximately 25 percent of the construction cost is for pollution control property. After construction of the LNP (a 6-year period), PEF estimates approximately $104 million a year in property taxes. The revenue from the property taxes would be split between the county and the school district, and the county's share of approximately $52 million exceeds its revenue from all sources of $38 million in 2006.

This increase in local property taxes could eventually lead to property tax relief for all taxpayers in the county, while increasing local services and providing capital to support investments in additional services. Such additional capacity is expected to exceed any additional demand for local services, including schools, because of the new construction workforce and their families. As discussed in ER Subsection 4.4.2, only about 5 percent of the new workforce is expected to reside in Levy County.

A second source of revenue would be from property taxes resulting from housing purchases by the construction labor force. However, such housing purchases will be disbursed throughout the eight-county region. Such housing demand would contribute toward sustaining property values and property tax collections in relation to the location and housing decisions of the construction workforce as discussed in ER Subsection 4.4.2.4.

4.4.2.2.3 Corporate Income Taxes

In Florida, corporate income taxes are collected by the state (Reference 4.4-010). PEF would pay corporate income taxes. These taxes would not be paid during the construction period because the LNP site would not be generating income until it started producing power. However, to the extent that

PEF purchases goods and services in the state, this contributes to the earnings of other corporations. As mentioned in ER Subsection 4.4.2.1.3, about $155 million a year would be spent on construction materials in the state over the construction period. Similarly, the purchases made by the construction workforce and other households whose jobs are indirectly related to the construction activity will contribute toward corporate income. Such corporate entities will pay a corporate income tax of 5.5 percent on net earnings to the state. This increase in corporate tax revenue is less than 1 percent of total corporate tax receipts of $2.4 billion collected by Florida in 2006 (References 4.4-009 and 4.4-010).

4.4.2.3 Social Structure

The social structure of the community can be affected by a population influx, as well as the construction of new facilities, and the activities of the construction workforce. However, as presented in ER Subsection 4.4.2, because the increase in the population residing in each of the counties is small in relation to their existing populations, this population increase will have only a small impact on social structure. Levy County, however, is primarily rural. The construction of a nuclear plant will bring new construction activity to the region, even if most workers are commuters from the neighboring counties and from the larger metropolitan districts in the region. Because the LNP site is currently a Greenfield site, no families or households are expected to be displaced during construction. ER Section 4.6 discusses associated measures and controls to limit environmental impacts.

The area around the LNP site already has grocery and department stores, and service stations that provide the basic necessities. It is not anticipated that the influx of construction workers and their families in any one county, including Levy County, will be sufficient to generate demand for new major housing developments, schools, or shopping centers that would change the social structure. Similarly, the construction activity is not expected to affect the local political or planning processes. The 5 percent of the migrant construction workforce from 1350 is approximately 68 new workers. Together with their families, this would increase the Levy County population by 169 people (68 multiplied by 2.49 [average household size]). This represents less than 1 percent of the population of the county (Reference 4.4-011). The population increases in each of the other eight counties would also be less than 1 percent of their existing populations. The effect on the social structure of the surrounding areas of the LNP site is anticipated to be SMALL.

4.4.2.4 Housing

As discussed in ER Subsection 4.4.2, construction activities are anticipated to last 6 years. The peak construction year is predicted for 2014 with a peak maximum of 2700 construction employees. It is assumed that 50 percent of these employees will already live in the region and 50 percent will migrate to the area with their families. Of the 50 percent migrating into the area, it is further assumed that they will locate to counties with established infrastructures that offer more housing options and social amenities. The following percentages of in-migrant

workers into each of the following counties are assumed: Levy (5 percent), Citrus (17 percent), Marion (35 percent), Alachua (35 percent), Dixie (2 percent), Gilchrist (2 percent), Hernando (2 percent), and Sumter (2 percent).

It is also assumed that migrant construction workers will only relocate to the region temporarily. Depending on their construction job and demand, some workers may live in the available vacant housing or rent for a few years in the area. The available housing units for the region are listed below. Workers not expected to work on-site for long periods of time may stay in local hotels. Hotel availability within the vicinity is discussed in Table 2.5-22. Mobile homes and recreational vehicle (RV) parks offer another temporary housing option for construction workers staying in the area for any period of time. Table 2.5-23 lists the number of mobile home and RV parks and their capacity for the region.

The 2000 Census and the U.S. Census Bureau 2006 American Community Survey indicated that the region has a robust housing market, as shown in the following housing status data:

- Levy County had 16,570 total housing units (2000 Census). Of this number, 13,867 (83.7 percent) were occupied and 2703 (16.3 percent) were vacant. Of the occupied housing units, 11,591 (83.6 percent) were occupied by owners and 2276 (16.4 percent) were occupied by renters. (Reference 4.4-012)

- Marion County had 152,858 total housing units (U.S. Census Bureau 2006 American Community Survey). Of this number, approximately 130,130 (85.1 percent) were occupied and 22,728 (14.9 percent) were vacant. Of the occupied housing units, 101,381 (77.9 percent) were occupied by owners and 28,749 (22.1 percent) were occupied by renters. (Reference 4.4-013)

- Citrus County had 73,609 total housing units (U.S. Census Bureau 2006 American Community Survey). Of this number, approximately 61,256 (83.2 percent) were occupied and 12,353 (16.8 percent) were vacant. Of the occupied housing units, 51,176 (83.5 percent) were occupied by owners and 10,080 (16.5 percent) were occupied by renters. (Reference 4.4-014)

- Alachua County had 106,746 total housing units (U.S. Census Bureau 2006 American Community Survey). Of this number, approximately 95,897 (89.8 percent) were occupied and 10,849 (10.2 percent) were vacant. Of the occupied housing units, 51,942 (48.7 percent) were occupied by owners and 43,955 (41.2 percent) were occupied by renters. (Reference 4.4-015)

- Dixie County had 7363 total housing units (2000 Census). Of this number, approximately 5205 (70.7 percent) were occupied and 2157 (29.3 percent) were vacant. Of the occupied housing units, 4498 (61.1 percent)

were occupied by owners and 707 (9.6 percent) were occupied by renters. (Reference 4.4-016)

- Gilchrist County had 5906 total housing units (2000 Census). Of this number, approximately 5021 (85.0 percent) were occupied and 885 (15.0 percent) were vacant. Of the occupied housing units, 4331 (73.3 percent) were occupied by owners and 690 (11.7 percent) were occupied by renters. (Reference 4.4-017)

- Hernando County had 77,423 total housing units (U.S. Census Bureau 2006 American Community Survey). Of this number, approximately 65,532 (84.6 percent) were occupied and 11,891 (15.4 percent) were vacant. Of the occupied housing units, 56,709 (73.2 percent) were occupied by owners and 8823 (11.4 percent) were occupied by renters. (Reference 4.4-018)

- Sumter County had 25,195 total housing units (2000 Census). Of this number, approximately 20,779 (82.5 percent) were occupied and 4416 (17.5 percent) were vacant. Of the occupied housing units, 17,972 (71.3 percent) were occupied by owners and 2807 (11.1 percent) were occupied by renters. (Reference 4.4-019)

Based on the vacant housing availability in all the counties, no housing shortages are expected. Because housing units in the region are abundant, LNP construction should have little impact on rent or sale prices for houses. The available mobile home and RV parks capacity in the region further reinforce that enough housing will be available during construction.

However, Levy, Marion, and Citrus counties are likely to experience a majority of the housing impacts because they are closest to the LNP site. Marion and Citrus Counties are expected to have little to no impacts on their housing markets because of the available housing units and infrastructures currently in place. Levy County is also expected to experience few housing impacts based on assumptions that most construction migrant workers will choose to live in more established counties and commute to the LNP site. Overall, the construction housing impacts are anticipated to be SMALL.

4.4.2.5 Educational System

The LNP is located in Levy County. Representatives from local school systems were contacted to determine current and future capacities. Because it is anticipated that 50 percent of the LNP construction workers already live in the region as further detailed in ER Subsection 4.4.2, constructing the LNP should not significantly increase the number of pupils in the surrounding school systems. A total of 3362 people will relocate to the region as discussed in ER Subsection 4.4.2. Based on the residential distribution for construction workers as presented on Table 4.4-1, Marion and Alachua Counties will experience the highest influx (35 percent or 1176 people) of construction workers and their families. Citrus and Levy counties will experience 573 and 169 new residents,

respectively. Each of the remaining four counties (Dixie, Gilchrist, Hernando, and Sumter) is estimated to experience a 2 percent or 67 person increase.

For 2005, the following populations were reported for each of the counties discussed above: 304,926 (Marion), 240,764 (Alachua), 132,635 (Citrus), 37,985 (Levy), 15,377 (Dixie), 16,211 (Gilchrist), 150,784 (Hernando), and 74,052 (Sumter) (Reference 4.4-001). Population projections for 2010 reported the following: 350,923 (Marion), 260,751 (Alachua), 147,437 (Citrus), 42,411 (Levy), 16,973 (Dixie), 18,583 (Gilchrist), 169,976 (Hernando), and 92,211 (Sumter) (Reference 4.4-009). Based on this data, the following increases in population percentages are expected: 15.3 percent (Marion), 8.3 percent (Alachua), 11.2 percent (Citrus), 11.7 percent (Levy), 10.4 percent (Dixie), 14.6 percent (Gilchrist), 12.7 percent (Hernando), and 24.5 percent (Sumter). While it is unlikely that LNP construction was taken into consideration in the future population's projections, the additional growth that would results from LNP construction would be minimal. It is estimated that less than 0.5 percent increase in each county will occur from construction worker and their families relocating to the region.

Approximately 161 primary and secondary schools are located within the 80-km (50-mi.) region. Currently, the Levy School District is under capacity, only three out of 17 schools in Citrus County are over capacity. Marion County School District currently has 23 out of 45 schools over capacity. For the remaining counties (Alachua, Dixie, Gilchrist, Hernando, and Sumter) any additional school impacts are anticipated to be dispersed among the other school districts. If the number of school-age children increases slightly, the school system might have sufficient capacity to serve them. Because construction workers and their families will be distributed amongst the eight counties, impacts on the educational system will be SMALL.

4.4.2.6 Recreation

ER Subsection 2.5.2.7 describes recreational facilities in the vicinity. Construction activities will temporarily disrupt recreational activities at some of these locations. Fishing, hunting, hiking, bicycling, and horseback riding are some recreational activities that will be affected by the construction of the LNP site and its associated components, such as the transmission line corridors, proposed rail line, blowdown pipeline corridor, heavy haul road, barge slip access road, and pumphouse (Figure 2.1-2). Most of the hiking, bicycling, and horseback riding trails in the CFG will be relatively unaffected by construction impacts because of the distance and vegetation screening between the LNP site and the CFG. Recreational users can always move to these other areas of the CFG during construction to avoid impacts. The trails on the Inglis Island portion of the CFG will be affected with visual and minor noise disturbances, but access will not be limited in these areas. Anglers will also be able to fish along the southern side of the CFG during construction of the LNP, but there would be visual aesthetics and minor noise impacts. Overall, most of the construction will occur on the opposite side of the CFBC where these facilities are located, which will create a small buffer to the foreseen visual and noise impacts (Figure 2.1-2).

The trails in the Goethe State Forest could also experience impacts that would be similar to those along the CFG. Hunters will still be able to hunt in the Goethe State Forest even though hunting was terminated on the LNP site property for safety and security. However, hunting in the forest may also be affected by minor noise and visual aesthetics around the LNP site, but the rest of the forest will not be affected. Therefore, the impact to on-site recreation will be SMALL. Figures 2.1-1 and 2.1-2 show the LNP site and its components related to the nearby recreational facilities discussed in this section.

The CFG and Goethe State Forest are not the only resources in the region for meeting recreational demands such as those listed previously. Fishing areas, hiking trails, and bicycling trails can also be found in the Crystal River Preserve State Park (Reference 4.4-020). Fanning Springs State Park also has an abundance of fishing areas (Reference 4.4-021). The Withlacoochee State and the Ocala National Forests also offer fishing, hiking, and hunting (References 4.4-022 and 4.4-023). The Withlacoochee State Forest also offers horseback riding trails (Reference 4.4-023).Those who use the CFG and Goethe State Forest facilities can modify their recreational activities by visiting these other recreational resources when noise and visual impacts begin.

It is assumed that 50 percent of the 2700 peak construction workforce will migrate into the region with their families. Therefore, a temporary increase in the regional population is expected especially for Marion, Citrus, and Alachua Counties. Table 2.5-26 lists the recreational areas within the 80-km (50-mi.) region and their average daily attendances, capacities, and utilization rates. Based on the relatively low daily attendance rates and the daily capacities listed in Table 2.5-26, the recreational areas should be able to accommodate an increase in population and tourism. Increased hunting is also expected in the region from the influx of construction workers. Hunting statistics for Goethe State Forest are shown in Table 2.5-27. An estimated 169 people, includes the construction workers and their estimated family size, are expected to relocate to Levy County. According to the hunting statistics, Goethe Forest has not reached hunter quotas and would be able to accommodate these additional people. This also assumes the hunters are following state and local hunting regulations. Hunting will also be available in the Ocala National Forest and the Withlacoochee State Forest. Communication with affected organizations and relocation of the affected resources will help minimize the impacts of construction activities.

Because of the abundance of recreational facilities and opportunities within the vicinity and region of the LNP site, construction impact on recreation is expected to be SMALL.

4.4.2.7 Public Facilities and Services

As stated in ER Subsection 4.4.2, it is assumed that 50 percent of the new construction workers will already live within the region and the remaining 50 percent of workers will relocate to the region. Therefore, public facilities

should not be overcrowded. SMALL impacts on public services and facilities are anticipated.

4.4.2.8 Security Services

Currently, the LNP site is a Greenfield site and security consists of basic post and barbed wire fences surrounding the property. PEF will develop and implement appropriate additional security mechanisms in accordance with Homeland Security and NRC regulations prior to start of construction activities.

Levy County has six county and eight municipal fire stations. Including the municipalities, Levy County has 88 full-time and 10 part-time sworn deputy officers. The Town of Inglis Police Station and Fire Department are the closest and are 6.6 km (4.1 mi.) from the LNP site. Citrus County is made up of one municipal and 23 county fire stations and has 236 full-time police officers (this includes the municipalities and county. Marion County Fire and Rescue is made up of 27 fire stations and 559 full-time sworn officers (this includes the municipalities and county. Overall, approximately 154 fire stations or departments, 35 sheriff's offices, and 44 police departments are located in the region.

In 2008, PEF consulted with emergency management services for Levy, Citrus, and Marion counties in regards to the LNP site. These county emergency management services organizations are able to support the emergency plan for the proposed expansion of LNP. Based on this information, existing public services and facilities will be capable of absorbing the increase in demand from security needs related to incremental growth associated with construction, and impacts are anticipated to be SMALL.

4.4.2.9 Water and Wastewater Services

As discussed in ER Subsection 4.4.2, construction activities are anticipated to last 6 years and the peak construction year is predicted for 2014 with a peak maximum of 2700 construction employees. It is also assumed that migrant construction workers will only relocate to the region temporarily. As discussed in ER Subsection 4.4.2.4, no housing shortages are expected, and there is sufficient availability of mobile home and RV parks within the region.

The excess in housing capacity implies that there is an excess capacity for water and wastewater services, and very few dwellings do not have indoor plumbing. Any increase in demand for water and wastewater services from construction activities should be adequately met with existing infrastructure. The potential increases in demand for water and wastewater services at peak construction is estimated to be 0.42 percent in Alachua County, 0.35 percent in Citrus County, 0.37 percent in Dixie County, 0.32 percent in Gilchrist County, 0.03 percent in Hernando County, 0.0 percent in Lake County, 0.36 percent in Levy County, 0.30 percent in Marion County, 0.0 percent in Pasco County, 0.0 percent in Putnam County and 0.06 percent in Sumter County. These estimates are based

on the assumed location distribution of in-migrant construction workers and their families as discussed in ER Subsection 4.4.2.

While on-site, construction workers will have access to use of portable restrooms which will be serviced by a licensed, portable sanitation company, while water will be trucked in until the potable water system described in ER Subsection 3.3.1.4 is completed. The LNP water source will be an aquifer. Based on these minimal potential increases, the region and the LNP site will have sufficient water and wastewater services to meet off- and on-site demands during construction. Communication with appropriate utilities will continue to assure adequate supply.

The impact on water and wastewater services from construction of the LNP is anticipated to be SMALL.

4.4.2.10 Transportation Facilities

The major highway located near the LNP site leading to Gainesville and Ocala is US-19/US-98. Figure 2.2-1 shows the transportation routes in the region of the LNP site. I-75 is the closest interstate and is 42.6 km (26.5 mi.) east of the LNP site (Figure 2.2-1).

At its nearest point, US-19/US-98 is located approximately 2 km (1.2 mi.) from the center of the LNP site (Figure 2.2-1). US-19/US-98 is the principal north/south arterial in Levy County and serves as the primary access point to the LNP site as presented on Figure 2.2-1.

A transportation study, conducted in 2007 by Lincks and Associates, Inc., assumed the traffic associated with the trips by commuting construction workers was estimated based on a trip generation rate of 1.75 trip ends per construction worker. Based on this rate, it is estimated that at the peak construction/operational phase, the project will attract 4725 daily trip ends associated with construction traffic. Based on the existing roadway network, residential development, lodging and commercial development, the distribution of the project traffic was estimated to be as follows:

- 30 percent to and from the north (through US-19) for 1418 daily trips.
- 70 percent to and from the south (through US-19) for 3307 daily trips.

The transportation study estimates traffic without the project from the north (through US-19) to the project access to be 8923 daily trips in the peak year of construction in 2014. Project daily trips are estimated to be 1418 for a total of 10,341. Daily trips without the project from the project access to the south on US-19 are estimated to be 8923. Daily trips from project construction activities are estimated to be 3307 for a total of 12,230 daily trips. The travel capacity of US-19 is estimated to be 40,800 trips in each direction. The study concludes that US-19 will operate at an acceptable level of service during the construction phase of the project (Reference 4.4-024).

The proposed blowdown pipeline route located in the berm on the north side of the CFBC will cross CR-40 and US-19 bridge. After crossing the CFBC, the route will also cross under an unpaved road and an unpaved bicycle/pedestrian path, which parallel the southern side of the CFBC and are maintained by the Office of Greenways and Trails. Coordination with FDOT and county officials, and completion of an impact analysis for West Canal Berm Road and CR-40, will lessen the impacts of traffic on the blowdown pipeline route.

Impacts on traffic as a result of increased volume from construction activities are anticipated to be SMALL to MODERATE.

4.4.2.11 Distinctive Communities

While the population in the region is relatively diverse, it is fairly homogenous in the vicinity, and no special populations or distinctive communities exist. Because only skilled craftsmen and incidental construction workers are expected to relocate to the region, no unique communities are expected to develop as a result of LNP site preparation or construction activities and impacts are anticipated to be SMALL.

4.4.3 ENVIRONMENTAL JUSTICE IMPACTS

This subsection uses NUREG-1555, Revision 0, to evaluate the potential for disproportionate impacts on low income and minority populations that could result from construction of the LNP. Census data were analyzed to determine the potential effects of construction on low income and minority populations. When these populations incur more than their “fair share,” it is deemed a disproportionate impact. Analysis of census data indicates that no disproportionate impacts on low income or minority populations in the region (as defined by the U.S. Department of Health and Human Services) will occur (Reference 4.4-025).

Environmental justice issues also include the environmental health effects of air and noise pollution on low income and minority populations. Construction activities will comply with federal, state, and local regulations. No impacts on minority or low income populations will occur from appurtenant facilities because the majority of the appurtenant facilities fall within the vicinity. Nor will construction limit access to any waterways potentially utilized for subsistence fishing. Positive impacts from construction of the LNP site are the potential for job opportunities to minority and/or low income populations.

4.4.3.1 Minority Populations

The evaluation process and baseline data used to identify minority populations living within the region that meet the requirements associated with the NRC guidance are defined in ER Subsection 2.5.4. Figure 2.5-14 identifies the minority populations in the region.

The spatial distribution of minority populations in the region occurs predominately in urban areas. Because the effects of construction would occur primarily on the site and adjacent properties, it is anticipated that there would be no disproportionate impacts on minority populations. Impacts on minority populations as a result of the construction of the LNP are anticipated to be SMALL.

4.4.3.2 Low Income Populations

Census block data for household income were evaluated to identify low income populations. Baseline income characteristic data are defined in ER Subsection 2.5.4. Figure 2.5-15 shows the populations below the poverty level within each census block.

The spatial distribution of low income populations in the region occurs predominately in urban areas. Based on the methodology discussed in ER Subsection 2.5.4.1, no low income populations are found within the vicinity of the LNP site. Impacts on low income populations as a result of the construction of the LNP will be SMALL.

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Table 4.4-1
Regional Housing and Residential Distribution for Construction Workers

County	Spatial Percent of Region	Permanent Housing	Owner Occupied Housing	Housing Units Theoretically Available to Rent or Purchase	RV/ Camping Capacity [a]	2005-2006 Mobile Homes [a]	Public Lodging Units	Total Units Available to Workers	Percent of Total Regional Units	Allocated Workers During Construction[b]
Levy[c]	20%	16,570	11,591	4979	1752	1303	936	8970	3%	67 or 5%
Citrus[d]	11%	73,609	51,176	22,433	6008	5829	2269	36,539	13%	229 or 17%
Marion[e]	24%	152,858	101,381	51,477	14,095	15,637	12,851	94,060	32%	473 or 35%
Alachua[f]	12%	106,746	51,942	54,804	3244	3545	31,771	93,364	32%	473 or 35%
Dixie	6%	7363	4498	2865	294	239	187	3585	1%	27 or 2%
Gilchrist	4%	5906	4331	1575	244	741	130	2690	1%	27 or 2%
Hernando	9%	77,423	56,709	20,714	5310	5823	2968	34,815	12%	27 or 2%
Sumter	8%	25,195	17,972	7223	5445	2577	1859	17,104	6%	27 or 2%
Total		**465,670**	**299,600**	**166,070**	**36,392**	**35,694**	**52,971**	**291,127**	**--**	**1350 or 100%**

Notes:

a) Data were obtained from Figure 2.5-6.

b) Reflects in-migration of 50 percent of 2700 peak construction work force.

c) Town of Inglis, 5 miles or 6 minutes, and Yankeetown, 6.6 miles or 10 minutes driving time from LNP site.

d) City of Crystal River, 15 miles or 20 minutes driving time from LNP site.

e) Town of Dunnellon, 19 miles and 27 minutes, and City of Ocala, 38 miles or 1 hour driving time from LNP site.

f) City of Gainesville, 50 miles or 1 hour 10 minutes driving time from LNP site.

Sources: References 4.4-004 and 4.4-009

4.5 RADIATION EXPOSURE TO WORKERS

This section evaluates the potential radiological dose impacts on construction workers at the LNP site. Because a portion of the LNP 2 construction period overlaps operation of LNP 1, construction workers at LNP 2 could be exposed to direct radiation and gaseous radioactive effluents from LNP 1 operations. Doses from the liquid pathways are not included because doses from this pathway are only applicable to the public who are exposed to very small releases to the Gulf of Mexico, such as through eating fish and invertebrates caught in gulf waters, and through shoreline activities, such as sunbathing or fishing, and swimming or boating in gulf waters. ER Section 5.4 provides more information on public doses from this pathway. Doses to construction workers during construction of LNP 1 are not evaluated because the only radiation sources prior to the startup of LNP 1 are background sources.

Radiation sources in the form of dry active waste, resins, spent (dry cask storage area) and new fuel, radiography sources, contaminated tools and equipment, irradiated components, and other sources could be present in temporary facilities or storage areas outside of the main plant structures. Temporary facilities (such as trailers, tents, and sea-land containers) may also be located in areas outside of plant structures. These temporary facilities may be used for decontamination, maintenance on contaminated components, radiography, waste processing, or other activities. If present, these types of facilities or storage could contribute to construction worker doses if not properly monitored and controlled. However, administrative controls and plant radiological safety programs and procedures will be in place, and used to maintain the doses from these sources and facilities during normal operations, within regulatory limits, and As Low As Reasonably Achievable (ALARA). Based on the type of materials and facilities involved, administrative limits on source activity will be established to keep the dose from accidental releases below allowable limits.

4.5.1 LNP SITE LOCATION

ER Section 2.1 describes the physical location of the LNP.

4.5.2 RADIATION SOURCES

Construction workers at the LNP site would not be exposed to any radiological sources until LNP 1 becomes operational. Workers constructing LNP 2 could be exposed to direct radiation and gaseous radioactive effluents emanating from the routine operation of LNP 1.

Radiological doses to construction workers would come from direct exposure to airborne effluent releases from LNP 1 and from background radiation. The radiation exposure at the site boundary is considered in DCD Subsection 12.4.2 and is echoed below.

DCD Subsection 12.4.2.1 provides the following information:

> The direct radiation from the containment and other plant buildings is negligible. The AP1000 design also provides storage of refueling water inside the containment instead of in an outside storage tank that eliminates it as a radiation source.

DCD Subsection 11.3.3.3 provides the following information:

> Airborne effluents are normally released through the plant vent or the turbine building vent. The plant vent provides the release path for containment venting releases, auxiliary building ventilation releases, annex building releases, radwaste building releases, and gaseous radwaste system discharge. The turbine building vents provide the release path for the condenser air removal system, gland seal condenser exhaust and the turbine building ventilation releases.

The expected radiation sources (radionuclides and associated activities) in the gaseous effluents are listed in DCD Table 11.3-3.

Based on the information quoted from the DCD, and that contained in ER Subsection 5.4.1.2, direct radiation exposure from LNP 1 operations is considered negligible and, therefore, will not be considered further.

As stated previously, exposure of LNP 2 construction workers to radioactive liquid effluents is also not evaluated because the discharge structure and blowdown piping will be completed during LNP 1 construction.

Doses from CREC operations are also considered negligible because of the distance from the LNP and the prominent wind direction for the area.

4.5.3 CONSTRUCTION WORKER DOSE ESTIMATES

The determination of construction worker doses from LNP 1 operation depends on the airborne effluent released and the atmospheric transport to the worker location. Doses to workers from normal effluent releases from LNP 1 operations are presented in Tables 4.5-1 and 4.5-2.

The methodology contained in the GASPAR II program (described in ER Section 5.4) was used to determine the doses for gaseous pathways. This program implements the radiological exposure models described in Regulatory Guide 1.109 for radioactivity releases in gaseous effluent.

Dose rate estimates were calculated for construction workers exposed to gaseous radioactive effluents through the following pathways:

- Direct radiation from immersion in the gaseous effluent plume and from particulates deposited on the ground.

- Inhalation of gases and particulates.

For the purposes of these calculations, the X/Q (atmospheric dilution factor) value (1.57E-04 seconds per cubic meter [sec/m^3]) calculated at 402 m (1320 ft.) in the worst meteorological sector (WMS), obtained from Table 2.7-58, was used in GASPAR II to calculate construction worker doses from the gaseous pathway, and conservatively bounds the construction worker location at LNP 2. The distance of 402 m (1320 ft.) was selected based on the assumption that this would be the location where a majority of the construction activities will take place. LNP 2 will be situated directly due north of LNP 1 (not in the WMS), where the X/Q value at 402 m (1320 ft.) is 1.27E-05 sec/m^3. Use of the WMS X/Q provides more than a factor of 10 margin in the calculated construction worker doses.

GASPAR II doses calculated at 402 m (1320 ft.) were adjusted based on construction worker residence time on the site or 2080 hours/8760 hours = 0.24. Results are presented in the following subsections.

4.5.4 COMPLIANCE WITH REGULATORY CRITERIA

LNP 2 construction workers are, for the purposes of radiation protection, members of the general public. This means that the dose rate limits are lower than the 1.0 milliSievert (mSv) (100 milliRoentgen equivalent man per year [mrem/yr]) limit to be considered a radiation worker. The construction workers (with the exception of certain specialty contractors loading fuel or using industrial radiation sources for radiography) do not deal with radiation sources.

There are three regulations that govern dose rates to members of the general public. Dose rate limits to the public are provided in 10 CFR 20.1301, 10 CFR 20.1302, and 10 CFR 50, Appendix I. The design objectives of 10 CFR 50, Appendix I, apply relative to maintaining dose ALARA for construction workers. In addition, 40 CFR 190 applies as it is referred to in 10 CFR 20.1301. The requirements of 10 CFR 20.1201 through 20.1204 do not apply to the construction workers because they are considered members of the public and not radiation workers.

4.5.4.1 10 CFR 20.1301

The 10 CFR 20.1301 limits annual doses from licensed operations to individual members of the public to 1.0 mSv (100 milliRoentgen equivalent man [mrem]) total effective dose equivalent. In addition, the dose from external sources to unrestricted areas must be less than 0.02 mSv (2 mrem) in any one hour. This applies to the public both outside and within access controlled areas.

Direct radiation exposures to construction workers from LNP 1 at the protected area fence line are assumed to be negligible. According to the DCD:

The direct radiation from the AP1000 containment and other plant buildings is negligible. The AP1000 design also provides storage of refueling water inside the containment instead of in an outside storage tank that eliminates it as a radiation source.

Therefore, exposures through this pathway were not calculated for construction workers.

4.5.4.2 10 CFR 50 Appendix I

The 10 CFR 50, Appendix I criteria apply only to effluents. The purpose of the criteria is to ensure adequate design of effluent controls. The annual limits for liquid effluents are 0.03 mSv (3 mrem) to the total body and 0.10 mSv (10 mrem) to any organ. For gaseous effluents, the pertinent limits are 0.05 mSv (5 mrem) to the total body and 0.15 mSv (15 mrem) to organs including skin. As shown in Table 4.5-1 there are no doses to construction workers from gaseous effluents that exceed the 10 CFR 50, Appendix I dose limits. Therefore, the criteria have been met.

4.5.4.3 40 CFR 190

The 40 CFR 190 criteria apply to annual doses, herein called dose rates because the units are in mrem/yr, received by members of the general public exposed to nuclear fuel cycle operations, such as nuclear power plants. Therefore, these regulations apply to LNP 2 construction workers on the plant site, just as they apply to members of the general public who live off-site. The most limiting part of the regulation states, “The annual dose equivalent (shall) not exceed 0.25 mSv (25 mrem) (per year) to the whole body.” In the case of LNP 2 gaseous effluent releases, if this regulation is met for the whole body, then the thyroid and organ components will also be met.

The results listed in Table 4.5-2 show that the doses to the whole body, thyroid, and doses to another organ meet the requirements of 40 CFR 190.

4.5.5 COLLECTIVE ANNUAL DOSES

Collective construction worker doses were conservatively estimated using the following information:

- The estimated maximum dose rate for the gaseous pathway.
- A construction worker exposure time of 2080 hours per year (40 hours per week for 52 weeks).
- An estimated peak loading of 2700 construction workers for construction of both units, anticipated to occur in during the first two quarters of 2014 by PEF.

The collective dose is the sum of all doses received by all workers. It is a measure of population risk. The total annual worker collective dose is 0.028 mSv (2.8 mrem) (whole body dose) x 2700 construction personnel = 0.088 person-Sievert (person-Sv) (8.8 person-roentgen equivalent man [person-rem]). The contribution to the annual average dose received by an individual from background radiation and other sources as reported in Table 5.7-A-2 of NUREG-1555 is about 3.6 Sievert per year (Sv/yr) (360 mrem/yr). Multiplying the annual average dose received by the construction workforce assumed yields a collective dose of 11.34 person-Sv (1134 person-rem) from background and manmade radiation. Doses to construction workers from LNP 1 operations are less than 1 percent of those received from natural and manmade radiation.

4.5.6 RADIATION PROTECTION AND ALARA PROGRAM

As a result of the exposures from LNP 1 normal operations, there will be a radiation protection and ALARA program for LNP 2 construction workers. This program will meet the guidance of Regulatory Guide 8.8 to maintain individual and collective radiation exposures ALARA. This program will also meet the requirements of 10 CFR 20.1302. Measures and controls to protect LNP 2 construction workers are given in ER Section 4.6. Because the construction workers are not radiation workers, but are, for the purposes of radiation protection, members of the general public, individual monitoring and training of construction workers on LNP 2 is not required. Construction workers will be treated, for purposes of radiation protection, as if they are members of the general public in unrestricted areas.

Based on the above discussion, impacts on workers during construction of LNP 2 resulting from annual doses associated with the ongoing operation of the LNP 1 will be SMALL and, therefore, further mitigation is not required.

Table 4.5-1
Comparison of Maximum Individual Dose Compared to 10 CFR 50, Appendix I Criteria

Type of Dose	Design Objective	Estimated Doses Including Occupancy
Liquid Effluents		
Whole Body Dose	3 mrem	Negligible
Organ Dose	10 mrem	Negligible
Gaseous Effluents (Noble Gases Only)		
Gamma Air Dose	10 mrad	4.3 mrad
Beta Air Dose	20 mrad	19 mrad
Total Body Dose	5 mrem	2.8 mrem
Skin Dose	15 mrem	13.9 mrem
Gaseous Effluents (Radioiodines and Particulates)		
Dose to any organ from all pathways (thyroid)	15 mrem	2.9 mrem

Notes:

mrad = milli-radiation absorbed dose
mrem = milliRoentgen equivalent man

Table 4.5-2
Comparison of Maximum Exposed Individual Doses from Gaseous Effluent Discharges to 40 CFR 190 Criteria

Type of Dose	Design Objective	Adjusted Annual Doses from Unit 1 Operations
Whole Body Dose	25 mrem	2.8 mrem
Thyroid Dose	75 mrem	2.9 mrem
Other Organ Doses	25 mrem	13.9 mrem (Skin)

Notes:

mrem = milliRoentgen equivalent man

4.6 MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS DURING CONSTRUCTION

This section summarizes potential adverse environmental impacts created by the LNP site preparation and construction activities discussed in previous sections of this Environmental Impacts of Construction chapter, along with associated measures and controls to limit those impacts.

4.6.1 REGULATORY CRITERIA

In accordance with NUREG-1555, potential adverse environmental impacts from construction activities are identified and addressed in this section, as well as the specific measures and controls to limit those adverse impacts.

4.6.2 ADVERSE ENVIRONMENTAL IMPACTS

PEF is committed to limiting, minimizing, and reducing adverse environmental impacts during construction activities wherever and whenever feasible and practical. Construction activities at the LNP site will result in certain adverse environmental impacts that are unavoidable.

Table 4.6-1 provides a summary of the impacts attributable to the cumulative impacts associated with the construction of the entire LNP. The “Potential Impact Significance” columns in Table 4.6-1 list the elements identified in NUREG-1555 that relate to construction activities. Table 4.6-1 summarizes the measures and controls to limit potential adverse environmental impacts during construction activities. The following list identifies elements with potential adverse environmental impacts that may be encountered during construction activities:

- Noise.
- Erosion and sediment.
- Air quality.
- Traffic.
- Effluents and wastes.
- Surface water.
- Groundwater.
- Land use protection/restoration.
- Water use protection/restoration.
- Terrestrial ecosystem.

- Aquatic ecosystem.
- Socioeconomic.
- Radiation exposure to construction workers.
- Other (site-specific).

Table 4.6-1 uses the NRC's three-level standard of significance levels for each element (SMALL, MODERATE, or LARGE). These significance levels were determined by evaluating the potential effects after any controls or mitigation measures had been implemented. The significance levels used in the evaluation were developed using Council on Environmental Quality (CEQ) guidelines set forth in the footnotes to Table B-1 of 10 CFR 51, Subpart A, Appendix B:

- **SMALL** — Environmental effects are not detectable or are so minor they will neither destabilize nor noticeably alter any important attribute of the resource.
- **MODERATE** — Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- **LARGE** — Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The impact categories evaluated in this chapter are the same as those used in the "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," NUREG-1437, Volumes 1 and 2.

In addition to the cumulative impacts attributable to the construction of the entire LNP facility that are summarized in Table 4.6-1, a breakdown or separation of "construction" and "preconstruction" environmental impacts has been estimated in Table 4.6-2 for the purpose of assessing impacts attributable specifically to the construction of "safety-related structures, systems, or components (SSCs)" as defined in 10 CFR 50.2, "Definitions." All other construction activities can be considered to be either "preconstruction" or "other than construction" under the definition of construction in 10 CFR 50.2.

Table 4.6-2 provides estimates of the percentage of impacts attributable to "construction" and to "preconstruction," as well as a summary of the basis for the estimates. The estimated construction related impacts presented in the table were based primarily on two factors, namely the area associated with the construction of SSCs and the labor hours associated with the construction of SSCs. Information related to these two factors is provided as follows:

- Construction Area — The LNP site consists of 3105 contiguous ac., exclusive of off-site linear facilities (heavy haul road, water pipelines,

electric transmission line, and rail corridors) or other supporting facilities such as the barge dock. The total estimated area that will be developed for the LNP is estimated to be approximately 1253 ac., exclusive of electric transmission lines. Of these developed areas, approximately 50 ac. will be developed for SSCs (25 ac. each for LNP 1 and LNP 2). The area that will be developed for the construction of SSCs therefore represents approximately 4 percent of the total area that will ultimately be developed (excluding electric transmission lines). Because this estimate does not include electric transmission lines, it is considered to be a very conservative estimate. For the purposes of this assessment, the impacted area associated with SSCs is considered to be less than 5 percent.

- Labor Hours — Based on preliminary construction estimates for all phases of development of the LNP, the estimated labor hours associated with the construction of SSCs is approximately 36 percent of the total labor hours associated with the development of the entire LNP. For the purpose of this assessment, the labor hours associated with SSC construction is considered to be less than 35 percent.

4.6.3 MEASURES AND CONTROLS TO LIMIT ADVERSE IMPACTS

The following measures and controls will limit potential adverse environmental impacts related to construction activities for the LNP:

- Compliance with federal, state, and local laws, ordinances, and regulations intended to prevent or minimize adverse environmental effects (for example, solid waste management, erosion and sediment control, air emissions, noise control, stormwater management, spill response and cleanup, and hazardous waste management).

- Compliance with applicable requirements of existing permits and licenses (for example, Florida NPDES permit for blowdown discharge, Operating License) for the CREC and other permits and licenses required for construction of the LNP (for example, application to the NRC for approval to conduct certain LWA construction activities, USACE Section 404 Permit, a NPDES for stormwater discharge, a Prevention of Significant Deterioration air permit, a 316(b) demonstration for the proposed CWIS, and the Florida SCA process for addressing state and local permitting information and coordination requirements).

- Compliance with existing PEF processes and/or procedures applicable to construction environmental compliance activities for the LNP (for example, solid waste management, hazardous waste management, and spill prevention and response).

- Incorporation of environmental requirements into construction contracts.

- Identification of environmental resources and potential effects during the development of this ER.

Construction activities at the proposed LNP will conform to the goals and criteria set forth in the regulatory guidelines and requirements. PEF will adhere to applicable local, state, and federal requirements during construction activities. Because technology may change between the time when the proposed LNP COLA is issued and a new facility is constructed, no specific commitments are implied in this presentation of potential mitigation measures and controls. The mitigation techniques presented herein represent BMP or standard industrial practices at the time of the LNP COLA submittal.

Table 4.6-1 (Sheet 1 of 8)
Summary of Measures and Controls to Limit Adverse Impacts during Construction

	Potential Impact Significance[(a), (b)]														
Section Reference	Noise	Erosion and Sediment	Air Quality	Traffic	Effluents and Wastes	Surface Water	Groundwater	Land Use [(c)]	Water Use [(d)]	Terrestrial Ecosystem	Aquatic Ecosystem	Socioeconomic	Rad Exp to Const Wkrs	Other (Site-Specific)	Impact Description or Activity	Specific Measures and Controls
ER Section 4.1	Land Use Impacts															
ER Subsection 4.1.1.1 Long-Term Land Use Restrictions and Physical Changes of Site and Vicinity								S							1. Impacts of changes to Levy County's current zoning and future land use designation for the LNP site. 2. Impacts on the LNP site. 3. Impacts associated makeup water pipeline corridor and appurtenant structures. 4. Impacts on agricultural and special uses at the LNP site. 5. Impacts on recreation. 6. Impacts on mineral resources 7. Impacts on nearby communities. 8. Impacts associated with access roadway upgrades.	1. Develop of revised future land use map and text amendment for Levy County comprehensive land use plan for submittal to FDCA and Levy County Board of County Commissioners. 2. Erosion control and stabilization measures; follow permit requirements; limit vegetation removal. 3. Erosion control and stabilization measures; follow permit requirements on CFBC; limit vegetation removal. 4. No special agricultural uses within the site boundary. 5. Coordination with appropriate groups/agencies as discussed in ER Section 1.2. 6. PEF to maintain control of mineral rights 7. Minimal expansion of infrastructure or demand on local infrastructure. 8. Erosion and sediment control and follow permit requirements.
ER Subsection 4.1.1.2 Short-Term Physical Changes in Land Use and Mitigation								S							1. Impacts associated with access roadway upgrades. 2. Impacts associated with stormwater drainage system. 3. Impacts on site grading.	1. Erosion and sediment control and follow permit requirements. 2. Erosion and sediment control. 3. Permitting and mitigation as required. See ER Section 4.6.

Table 4.6-1 (Sheet 2 of 8)
Summary of Measures and Controls to Limit Adverse Impacts during Construction

	Potential Impact Significance[a], [b]														
Section Reference	Noise	Erosion and Sediment	Air Quality	Traffic	Effluents and Wastes	Surface Water	Groundwater	Land Use [c]	Water Use [d]	Terrestrial Ecosystem	Aquatic Ecosystem	Socioeconomic	Rad Exp to Const Wkrs	Other (Site-Specific)	Impact Description or Activity	Specific Measures and Controls
ER Subsection 4.1.1.3 Construction Impacts on the Geologic Environment								S							Impacts on mineral resources.	PEF to maintain control of mineral rights; no mineral rights outstanding or leased.
ER Subsection 4.1.2.1 Transmission Corridors								S							Impacts associated with construction of three new transmission corridors to three high-voltage substations and a 500-kV switchyard.	Follow BMPs, ROW preparation; erosion and sediment controls; minimize clearing; minimize effects on human populations, wetlands and water bodies, archaeological and historic sites, vegetation, and wildlife; and comply with permit and regulatory requirements and mitigation plans as required. See ER Subsection 2.2.2 and Section 3.7.
ER Subsection 4.1.2.2 Off-Site Areas								S							Impacts from construction of heavy haul road, barge slip access road, proposed rail line, and makeup water and blowdown pipeline corridors.	Erosion and sediment controls; Construct stormwater drainage systems; follow stormwater BMPs; and comply with regulatory and permit requirements as required.
ER Subsection 4.1.2.3 Short-Term Physical Changes in Land Use and Mitigation								S							1. Impacts on nearby structures and roadways. 2. Impacts associated with stormwater drainage system.	1. Minimal expansion of infrastructure, use of access roads, and use of restricted construction zones. See ER Subsection 2.2.2. 2. Erosion and sediment control. See ER Section 4.6.
ER Subsection 4.1.3 Historic Properties								S							Impacts of construction on or near archeological or historic properties.	Conduct additional surveys prior to construction and ground disturbing activities. Consultation with SHPO. See ER Subsection 2.5.3.

Table 4.6-1 (Sheet 3 of 8)
Summary of Measures and Controls to Limit Adverse Impacts during Construction

	Potential Impact Significance[a], [b]															
Section Reference	Noise	Erosion and Sediment	Air Quality	Traffic	Effluents and Wastes	Surface Water	Groundwater	Land Use [c]	Water Use [d]	Terrestrial Ecosystem	Aquatic Ecosystem	Socioeconomic	Rad Exp to Const Wkrs	Other (Site-Specific)	Impact Description or Activity	Specific Measures and Controls
ER Section 4.2	Water-Related Impacts															
ER Subsection 4.2.1.1 Freshwater Streams		S				S									Hydrological impacts from construction at LNP site, along transmission line corridors, and pipeline routes.	Follow regulatory and permit requirements; erosion and sediment control; revegetation of disturbed land; use of BMPs; and minimize clearing and ground disturbance.
ER Subsection 4.2.1.2 Lakes and Impoundments						S									Impacts on surface water bodies including wetlands.	Implement sediment and erosion control; comply with regulatory and permit requirements; use of BMPs; and trenchless technologies. See ER Subsection 4.2.1.1 on grading and drainage.
ER Subsection 4.2.1.3 Cross Florida Barge Canal						S			S						Impacts on CFBC.	Implement sediment and erosion control; comply with regulatory and permit requirements; use of BMPs; and trenchless technologies. See ER Subsection 4.2.1.1 on grading and drainage.
ER Subsection 4.2.1.4 Groundwater						S	S								Hydrologic alterations from construction of the LNP.	Groundwater elevations will be monitored during construction and dewatering during construction will be kept to a minimum.
ER Subsection 4.2.1.5 Wetlands		S				S									Hydrological impacts from construction in wetlands.	Follow regulatory and permit requirements; erosion and sediment controls; use of silt fences; revegetation of disturbed land; minimize clearing and ground disturbance; compliance with FESC manual and ROMA plan; stockpiling, characterizing, and proper disposal of dredge spoils, if necessary.
ER Subsection 4.2.2.1 Freshwater Water Bodies						S			S						Impacts on CFBC and other surface water bodies.	Implement sediment and erosion control; comply with regulatory and permit requirements; use of BMPs; and trenchless technologies.

Table 4.6-1 (Sheet 4 of 8)
Summary of Measures and Controls to Limit Adverse Impacts during Construction

	Potential Impact Significance[a], [b]															
Section Reference	Noise	Erosion and Sediment	Air Quality	Traffic	Effluents and Wastes	Surface Water	Groundwater	Land Use [c]	Water Use [d]	Terrestrial Ecosystem	Aquatic Ecosystem	Socioeconomic	Rad Exp to Const Wkrs	Other (Site-Specific)	Impact Description or Activity	Specific Measures and Controls
ER Subsection 4.2.2.2 Wetlands						S			S						Impacts on wetlands at the LNP site.	Use of ROMA Plan.
ER Subsection 4.2.2.3 Groundwater Use							S		S						Impacts on groundwater use.	Groundwater elevations will be monitored during construction and dewatering during construction will be kept to a minimum. See ER Subsection 4.2.1.4.
ER Section 4.3	Ecological Impacts															
ER Subsection 4.3.1.1 Plant Site										S - M					1. Impacts on terrestrial ecology associated with the LNP site. 2. Impacts on vegetative communities. 3. Impacts on wildlife.	1. Erosion and sediment controls; minimize land disturbance; dust control; manage stockpiles; comply with regulation and permit requirements; follow BMPs; use of designated staging areas; erosion and sediment controls; stabilization of disturbed areas. 2. Erosion and sediment controls; minimize land disturbance; dust control; manage stockpiles; comply with regulation and permit requirements; follow BMPs; use of designated staging areas; erosion and sediment controls; stabilization of disturbed areas. 3. Maintain noise level typical of construction projects and restrict use of elevated equipment to avoid avian collisions; coordination with state and federal regulatory agencies; avoid disturbance of bald eagle nest and occupants; compliance with applicable permit requirements for rare and listed species.
ER Subsection 4.3.2.1 On-site Pools						S					S				1. Impacts from construction of the LNP on aquatic ecosystems in the LNP site. 2. Impacts on water quality.	1. Use of sediment basins 2. Sediment and erosion control.

Table 4.6-1 (Sheet 5 of 8)
Summary of Measures and Controls to Limit Adverse Impacts during Construction

	Potential Impact Significance[(a), (b)]															
Section Reference	Noise	Erosion and Sediment	Air Quality	Traffic	Effluents and Wastes	Surface Water	Groundwater	Land Use [(c)]	Water Use [(d)]	Terrestrial Ecosystem	Aquatic Ecosystem	Socioeconomic	Rad Exp to Const Wkrs	Other (Site-Specific)	Impact Description or Activity	Specific Measures and Controls
ER Subsection 4.3.2.2 Cooling Water Intake Structure											S				1. Impacts construction of CWIS on the CFBC shoreline on aquatic ecology. 2. Impacts on water quality. 3. Impacts on vegetative communities. 4. Impacts on wildlife.	1. Regular maintenance of equipment; compliance with applicable regulations and BMPs; and use of cofferdams. 2. Erosion and sediment control during construction and dredging; maintenance and compliance with applicable permit requirements, and coordination with regulatory agencies. 3. Compliance with BMPs; coordination with regulatory agencies; and compliance with applicable regulatory and permit requirements. 4. Consultation with regulatory agencies for protection requirements for rare and listed species (for example, manatee); erosion and sediment controls, and compliance with applicable permit conditions.
ER Subsection 4.3.2.3 Cooling System Blowdown Discharge Pipeline											S				1. Impacts of blowdown pipeline corridor construction on aquatic ecology. 2. Impacts on water quality. 3. Impacts on vegetative communities. 4. Impacts on wildlife.	1. Minimize disturbance, with applicable permit requirements, and coordination with regulatory agencies. 2. Coordination with regulatory agencies and compliance with applicable permit requirements. 3. Follow BMPs to manage and protect rare plants along pipeline ROWs; coordination with regulatory agencies; and compliance with applicable permit requirements. 4. Coordinate with regulatory agencies and compliance with applicable permit requirements.
ER Section 4.4	Socioeconomic Impacts															
ER Subsection 4.4.1.1 Noise	S														Impacts of construction-related noise.	Limit use of loud equipment or activities to day time, and coordinate with county and state regulatory agencies.

Table 4.6-1 (Sheet 6 of 8)
Summary of Measures and Controls to Limit Adverse Impacts during Construction

	Potential Impact Significance[a], [b]															
Section Reference	Noise	Erosion and Sediment	Air Quality	Traffic	Effluents and Wastes	Surface Water	Groundwater	Land Use [c]	Water Use [d]	Terrestrial Ecosystem	Aquatic Ecosystem	Socioeconomic	Rad Exp to Const Wkrs	Other (Site-Specific)	Impact Description or Activity	Specific Measures and Controls
ER Subsection 4.4.1.2 Air Quality			S												Impacts from construction activities on air quality.	Dust control; stabilization of disturbed areas; compliance with air pollution control regulations; control of open burning; mitigation measures on equipment as applicable; coordination with regulatory agencies; and compliance with applicable permit requirements.
ER Subsection 4.4.1.3 Visual Aesthetic Disturbances														S	Impact of construction activities on visual aesthetic disturbances.	Stabilization of cleared areas; restrictions on construction laydown areas; minimize disturbance and visual intrusion; controlled burning of logging debris; and removal of construction debris in a timely manner.
ER Subsection 4.4.2.3 Social Structure												S			Impacts on social structure.	Specific measures and controls are not needed; impacts on social structure anticipated to be minor.
ER Subsection 4.4.2.4 Housing												S			Impacts on housing availability from construction.	Specific measures and controls are not needed, minor housing impacts expected.
ER Subsection 4.4.2.5 Educational System												S			Impacts to educational systems from construction.	Consultation with local school systems, minor impacts anticipated.
ER Subsection 4.4.2.6 Recreation												S		S	Impacts of construction of LNP site to recreational facilities and opportunities.	Specific measures and controls are not needed; impacts on social structure anticipated to be minor.
ER Subsection 4.4.2.7 Public Services and Facilities												S			Impacts of construction to public services and facilities.	Specific measures and control not needed, minor impacts expected.

Table 4.6-1 (Sheet 7 of 8)
Summary of Measures and Controls to Limit Adverse Impacts during Construction

	Potential Impact Significance[(a), (b)]															
Section Reference	Noise	Erosion and Sediment	Air Quality	Traffic	Effluents and Wastes	Surface Water	Groundwater	Land Use [(c)]	Water Use [(d)]	Terrestrial Ecosystem	Aquatic Ecosystem	Socioeconomic	Rad Exp to Const Wkrs	Other (Site-Specific)	Impact Description or Activity	Specific Measures and Controls
ER Subsection 4.4.2.8 Security Services														S	Impacts on site security and access restrictions.	Security forces, structures, and access restrictions will be necessary for the LNP site.
ER Subsection 4.4.2.9 Water and Wastewater Services												S			Impacts on water and wastewater services.	Current capacities of water and wastewater treatment facilities appear to be sufficient to meet demands; communication with appropriate utilities is ongoing.
ER Subsection 4.4.2.10 Transportation Facilities				S M											1. Impacts on primary transportation routes providing access to the site. 2. Impacts on traffic related to construction of the LNP. 3. Impacts on log-hauling traffic. 4. Impacts of blowdown pipeline route on county transportation routes.	1. No specific measures and controls identified. 2. Coordination with FDOT, completion of transportation impact analysis, and evaluation of a temporary access road off US-19/US-98. 3. Traffic impacts are anticipated to be temporary and short in duration. 4. Coordination with FDOT and county, and completion of transportation impact analysis for West Canal Berm Road and CR-40.
ER Subsection 4.4.2.11 Distinctive Communities												S			Impacts on special or distinctive communities.	No special or distinctive communities identified; no specific measures are anticipated.
ER Subsection 4.4.3.1 Minority Populations												S			Impacts on racial, ethnic, and special groups in the region.	No impacts anticipated; no specific measures and controls identified.
ER Subsection 4.4.3.2 Low Income Populations												S			Impacts on low income populations.	No impacts anticipated; no specific measures and controls identified.

Table 4.6-1 (Sheet 8 of 8)
Summary of Measures and Controls to Limit Adverse Impacts during Construction

	Potential Impact Significance[(a), (b)]															
Section Reference	Noise	Erosion and Sediment	Air Quality	Traffic	Effluents and Wastes	Surface Water	Groundwater	Land Use [(c)]	Water Use [(d)]	Terrestrial Ecosystem	Aquatic Ecosystem	Socioeconomic	Rad Exp to Const Wkrs	Other (Site-Specific)	Impact Description or Activity	Specific Measures and Controls
ER Section 4.5	Radiation Exposure to Workers															
ER Subsection 4.5.6 Radiation Protection and ALARA Program					S								S		Impacts on construction workers from direct radiation and to the radioactive effluents from LNP routine operation.	Implementation of radiation protection and ALARA program and compliance with regulatory agencies.

Notes:

a) The assigned potential impact significance levels of (S)MALL, (M)ODERATE, or (L)ARGE are based on the assumption that mitigation measures and controls would be implemented.

b) A blank in the elements column denotes “no impact” on that specific element because of the assessed activities.

c) Land Use Protection/Restoration.

d) Water Use Protection/Restoration.

Table 4.6-2 (Sheet 1 of 6)
Summary of Construction- and Preconstruction-Related Impacts for Safety-Related Structures, Systems, or Components

Section Reference	Potential Impacts and Significance [a]	Estimated Impacts (%)		Basis of Estimate
		Construction [b]	Preconstruction	
ER Section 4.1 Land Use Impacts				
ER Subsection 4.1.1.1 Long-Term Land Use Restrictions and Physical Changes of Site and Vicinity	S – Land Use	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 acres (25 acres each for units LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.1.1.2 Short-Term Physical Changes in Land Use and Mitigation	S – Land Use	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 acres (25 acres each for units LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.1.1.3 Construction Impacts on the Geologic Environment	S – Land Use	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 acres (25 acres each for units LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.1.2.1 Transmission Corridors	S – Land Use	0	100	Transmission corridors are not included in the definition of construction of SSCs.
ER Subsection 4.1.2.2 Off-Site Areas	S – Land Use	0	100	There are no off-site areas associated with the project that are included in the definition of construction of SSCs.
ER Subsection 4.1.2.3 Short-Term Physical Changes in Land Use and Mitigation	S – Land Use	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 acres (25 acres each for units LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.1.3 Historic Properties	S – Land Use	0	100	The impact of historic properties will apply only to preconstruction activities because they will be identified prior to land clearing, grading, installation of drainage, erosion and other environmental mitigation measures, and construction of temporary roads and laydown areas.

Table 4.6-2 (Sheet 2 of 6)
Summary of Construction- and Preconstruction-Related Impacts for Safety-Related Structures, Systems, or Components

Section Reference	Potential Impacts and Significance [a]	Estimated Impacts (%)		Basis of Estimate
		Construction [b]	Preconstruction	
ER Section 4.2 Water-Related Impacts				
ER Subsection 4.2.1.1 Freshwater Streams	S – Erosion and Sediment S – Surface Water	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 ac. (25 ac. each for LNP 1 and LNP 2) of the project area being developed (that is, 1253 ac., excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.2.1.2 Wetlands	S – Erosion and Sediment S – Surface Water	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 ac. (25 ac. each for LNP 1 and LNP 2) of the project area being developed (that is, 1253 ac., excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.2.1.3 Impacts from Surface Disturbance	S – Erosion and Sediment S – Effluents and Wastes S – Surface Water S – Water Use	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 ac. (25 ac. each for LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.2.1.4 Impacts from Subsurface Disturbance	S – Erosion and Sediment S – Surface Water	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 ac. (25 ac. each for LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.2.1.5 Groundwater	S – Surface Water S – Groundwater	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 ac. (25 ac. each for LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).

Table 4.6-2 (Sheet 3 of 6)
Summary of Construction- and Preconstruction-Related Impacts for Safety-Related Structures, Systems, or Components

Section Reference	Potential Impacts and Significance [a]	Estimated Impacts (%)		Basis of Estimate
		Construction [b]	Preconstruction	
ER Subsection 4.2.2.1 Freshwater Surface Water	S – Surface Water S – Water Use	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 acres (25 acres each for units LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.2.2.2 Wetlands	S – Surface Water S – Water Use	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 acres (25 acres each for units LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.2.2.3 Groundwater	S – Groundwater S – Water Use	5	95	Estimates are based on the area of land use that will be dedicated to safety-related structures, systems, or components (SSCs) and the assumption that the construction of SSCs will occur on no more than approximately 50 acres (25 acres each for units LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Section 4.3 Ecological Impacts				
ER Subsection 4.3.1.1 Plant Site	S to M – Terrestrial Ecosystems	0	100	Ecological impacts will occur during preconstruction activities and mobile wildlife species are expected to vacate the site until construction is complete. Native plants will not be significantly impacted because the area has already been heavily modified due to silvicultural operations and impacts will occur during land clearing and preparation.
ER Subsection 4.3.2.1 On-Site Pools	S – Surface Water S – Aquatic Ecosystem	0	100	Ecological impacts will occur during preconstruction activities and mobile wildlife species are expected to vacate the site until construction is complete. Native plants will not be significantly impacted because the area has already been heavily modified due to silvicultural operations and impacts will occur during land clearing and preparation.

Table 4.6-2 (Sheet 4 of 6)
Summary of Construction- and Preconstruction-Related Impacts for Safety-Related Structures, Systems, or Components

Section Reference	Potential Impacts and Significance [a]	Estimated Impacts (%)		Basis of Estimate
		Construction [b]	Preconstruction	
ER Subsection 4.3.2.2 Cooling Water Intake Structure (CWIS)	S – Aquatic Ecosystem	0	100	The CWIS will be located off-site and is not included in the definition of construction of SSCs.
ER Subsection 4.3.2.3 Cooling System Blowdown Discharge Pipeline	S – Aquatic Ecosystem	0	100	The cooling system blowdown pipeline is not included in the definition of construction of SSCs
ER Section 4.4 Socioeconomic Impacts				
ER Subsection 4.4.1.1 Noise	S – Noise	20	80	Most perceptible noise impacts at off-site locations will occur during the most intense operations in the power block area and will include pile driving of SSCs. Estimates are based on the average of the percent of labor hours dedicated to safety-related structures, systems, or components (SSCs) (35%) and the percent of land dedicated to SSCs (<5%). (Average stated as 20%)
ER Subsection 4.4.1.2 Air Quality	S – Air Quality	20	80	Air emissions will occur in the vicinity of the SSCs (power block area) during construction. Estimates are based on the average of the percent of labor hours dedicated to constructing safety-related structures, systems, or components (SSCs) (35%) and the percent of land dedicated to SSCs (<5%). (Average stated as 20%)
ER Subsection 4.4.1.3 Visual Aesthetic Disturbances	S – Other (Site-Specific)	5	95	SSCs (power block buildings) with significant elevation will have only a very small area/footprint and will have very limited visibility from a minimum number of off-site locations. Land clearing or de-forestation for SSCs will not be visible from off-site locations, nor will changes in vegetation. Large cranes may also be used during construction of the SSCs and will be operated in the small footprint/area of the SSCs. Estimates are based on the area of land use that will be dedicated to SSCs and the assumption that the construction of SSCs will occur on no more than approximately 50 ac. (25 ac. each for LNP 1 and LNP 2) of the project area being developed (that is, 1253 acres, excluding off-site electric transmission lines) (4%, restated as <5%).
ER Subsection 4.4.2.3 Social Structure	S - Socioeconomic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).

Table 4.6-2 (Sheet 5 of 6)
Summary of Construction- and Preconstruction-Related Impacts for Safety-Related Structures, Systems, or Components

Section Reference	Potential Impacts and Significance [a]	Estimated Impacts (%)		Basis of Estimate
		Construction [b]	Preconstruction	
ER Subsection 4.4.2.4 Housing	S - Socioeconomic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Subsection 4.4.2.5 Educational System	S - Socioeconomic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Subsection 4.4.2.6 Recreation	S – Socioeconomic S – Other (Site-Specific)	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Subsection 4.4.2.7 Public Services and Facilities	S - Socioeconomic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Subsection 4.4.2.8 Security Services	S – Other (Site-Specific)	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Subsection 4.4.2.9 Water and Wastewater Services	S - Socioeconomic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Subsection 4.4.2.10 Transportation Facilities	S to M - Traffic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Subsection 4.4.2.11 Distinctive Communities	S - Socioeconomic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).

Table 4.6-2 (Sheet 6 of 6)
Summary of Construction- and Preconstruction-Related Impacts for Safety-Related Structures, Systems, or Components

Section Reference	Potential Impacts and Significance [a]	Estimated Impacts (%)		Basis of Estimate
		Construction [b]	Preconstruction	
ER Subsection 4.4.3 Environmental Justice	S - Socioeconomic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Subsection 4.4.3.1 Minority Populations	S - Socioeconomic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Subsection 4.4.3.2 Low Income Populations	S - Socioeconomic	35	65	Estimates are based on the percent of total project labor hours that will be dedicated to the construction of safety-related structures, systems, or components (SSCs), all of which will be in the power block areas for LNP 1 and LNP 2 (36%, restated as 35%).
ER Section 4.5 Radiation Exposure to Workers				
ER Subsection 4.5.6 Radiation Protection and ALARA Program	S – Effluent and Wastes S – Rad Exp to Constr Wkrs	20	80	Estimates are based on 50% of the workforce remaining during the completion of the SSCs for LNP 2 (half of 36%, restated as 20%).

Notes:

a) The assigned potential impact significance levels of (S)MALL, (M)ODERATE, or (L)ARGE are based on the assumption that mitigation measures and controls would be implemented.

b) “Construction,” as defined in 10 CFR 50.2 “Definitions” refers to the construction of “safety-related structures, systems, or components (SSCs) of a facility”

4.7 CUMULATIVE IMPACTS RELATED TO CONSTRUCTION ACTIVITIES

In accordance with NUREG-1555, Environmental Standard Review Plan (ESRP) 4.7, this section summarizes potential cumulative environmental impacts associated with the construction of the LNP site.

4.7.1 CUMULATIVE ENVIRONMENTAL IMPACTS

This subsection has identified the cumulative impacts associated with the operation of the LNP. As identified in NUREG-1555, ESRP 4.7, cumulative impact is defined as:

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

As identified in NUREG-1555, ESRP 4.7, the anticipated magnitude of the potential cumulative impacts was surmised from the following information:

- Identification of the geographic area to be considered in evaluating cumulative impacts.
- Identification of past, present, and reasonably foreseeable federal, nonfederal, and private actions that could have meaningful cumulative impacts with the proposed action.
- Information on cumulative impacts of relevant actions within the identified geographic area.

4.7.2 IDENTIFICATION OF CUMULATIVE IMPACTS ASSOCIATED WITH THE PROPOSED ACTION

USEPA provides the following guidance in identifying and determining cumulative impacts: Cumulative impacts can affect a broad array of resources and ecosystem components. In addition to considering the biological resources that are the staple of NEPA analysis, examples of other resources that should be considered include socioeconomic services and issues, human health, recreation, quality of life issues, and cultural and historical resources (Reference 4.7-001).

Cumulative impacts associated with construction of the LNP are listed in Table 4.6-1. The table provides a summary of cumulative impacts associated with construction of the LNP and uses the NRC's three-level standard of significance levels for each element (SMALL, MODERATE, or LARGE). The use of these significance levels provides a characterization of the cumulative impacts associated with operating the LNP on the region's ecological resources, socioeconomic resources, human health, recreation, quality of life issues, and cultural and historical resources. The region surrounding the LNP site comprises

an 80-km (50-mi.) radius that includes Levy, Citrus, Marion, Alachua, Dixie, Gilchrist, Hernando, Lake, Pasco, Putnam, and Sumter counties. ER Subsection 2.2.3.1 provides a description of the region while Table 2.2-2 provides a tabulation of areas within the region, organized by land use category. The following significance levels used in the evaluation were developed using the CEQ guidelines set forth in the footnotes to Table B-1 of Title 10 of the CFR 51, Subpart A, Appendix B:

- **SMALL** — Environmental effects are not detectable or are so minor they will neither destabilize nor noticeably alter any important attribute of the resource.

- **MODERATE** — Environmental effects are sufficient to alter noticeably but not to destabilize important attributes of the resource.

- **LARGE** — Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The impact categories evaluated in this section are the same as those used in the Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437, Volumes 1 and 2.

The potential impacts resulting from construction of one or more new nuclear units at the LNP site are evaluated in ER Sections 4.1 through 4.5. For the duration of the construction of the proposed action, the evaluation took into account the potential impacts from factors known or likely to affect the environment. This included considering conditions at the site and surrounding vicinity from past, present, and future human activities.

For each impact area, PEF anticipates the potential cumulative impacts resulting from construction to be generally SMALL, and additional mitigation would not be warranted. However, ecological impacts from construction could have a MODERATE impact. In these cases, mitigation measures may be warranted, including wetland and habitat restoration at the LNP site.

4.7.3 REFERENCES

4.7-001 U.S. Environmental Protection Agency, Office of Federal Activities (2252A), Consideration of Cumulative Impacts in EPA Review of NEPA Documents, EPA 315-R-99-002/May 1999.

4.8 ACTIVITIES UNDERTAKEN UNDER A LIMITED WORK AUTHORIZATION

The LWA for the LNP will allow PEF to undertake activities in advance of approval of the COLA for the following items:

- Prepare nuclear island foundation surface with dental concrete.
- Place roller compacted concrete under the nuclear islands.
- Install mud mat under the nuclear islands.
- Install waterproofing beneath the mud mat under the nuclear islands.
- Install rebar in the nuclear island concrete foundations.
- Erect safety related concrete placement forms.
- Install Turbine Building foundation drilled shafts.
- Install Annex Building foundation drilled shafts.
- Install Radwaste Building foundation drilled shafts.
- Install circulating water piping between the cooling tower basins and the entrance point to the turbine building condensers.
- Install the raw water system intake structure and make-up line to the cooling tower basin.

The impacts associated with these activities are described in the preceding sections of this chapter and specifically in ER Sections 4.1, 4.2, 4.3, 4.4, and 4.6.